THE WELL-SPRING OF SCIENCES:

Adams 8.63.1

Which teacheth the perfect worke and practise of Arithmeticke, *both in whole Numbers and Fractions : Set forth*

By

HVMFREY BAKER

Londoner.

Now newly perused, augmented, & amended in all the three parts:

Whervnto is also added certaine Tables of the agreement of the measures and waights of diuers places in Europe, the one with the other : as by the Table appeareth.

AT LONDON,

Printed by *Tho: Pursoot*, and are to be sold by *John Grismond* in *Ivy-Lane* at the signe of the *Gun*. 1631.

he accomplished within the compasse of certaine Number of dayes, expressing moreouer, what hee made in euery day, and of certaine his creatures how many he made, as it appeareth in the booke of Genesis, written by speciall Revelation of the holy Ghost, wherein the divine Maiestie of GOD could not bee knowne vnto vs without the knowledge of Numbers, nor *Moyses* haue vnderstoode what himselfe had written. And *Salomon* the wisest man that euer was, considering the very depth of all things within his minde, to whome God hath giuen a greater gift of wisedome, than to any man either before or since, doubted not to breake foorth in these wordes, saying: Thou O Lord hast disposed all thinges in Measure, Number, and Waight, for thus it pleased him to iudge: who in another place testifieth how that he hath searched deeper into the causes and knowledge of all things than any other man in the world.

These Testimonies (right worship-

4

full) doe manifestly teach vs, what we ought to thinke of the cause, and originall of Arithmeticke, and partly also how necessary it is in the life of man, that vnlesse by nature wee haue some feeling and vnderstanding therein, wee are no better then beasts, and in this respect worse, for that we retaine not that whereunto wee are as specially borne, as naturally they doe, some to running, some to smelling, some to hearing, some to flying, and some to swimming. Take away Arithmeticke, wherein differeth the Sheapheard from the Sheepe, or the Horse-keeper from the Asse? Surely but onely in shape and figure, which as the Learned affirme, is a very slender cause of difference. Wherefore not without iust cause haue the auncient Fathers and Philosophers singularly extolled the knowledg of Arithmeticke, diligently trayning vp their Youth therein, as in a Science most necessary of it selfe, considering the deepe deuises, the profound practises,

TO THE RIGHT *Worshipfull the Gouerners, Aßistants, and the rest of the* Companie of Marchants Adventurers: *Humfrey Baker* Londoner, *wisheth health with continuall increase of commodity by their worthy trauaile.*

IF the Knowledge of Arithmeticke (Right Worshipfull) were of so small profit in the life of Man, or so little vsed in our Worldly Affaires, that it might bee vvell left, or but seldome frequented, it were well done by the Professors thereof to pen very long and Eloquent Orations, in setting forth the Commendation of the same. But since

experience hath taught to be true the old Prouerbe: *That where good wine it to sell, there needs no garland to be hanged out.* Me thinketh they doe great iniurie to Arithmeticke, that seeke to heare the commodities thereof set forth in a short Epistle, & surely they ouercharge me in laying such a burthen on my backe as were too importable for the greatest Orator; for the skill hereof is well knowne, immediately to haue flowed from the wisedome of God, into the heart of man, whome hee hath created the chiefe Image and instrument of his prayse and glory, reuealing himselfe vnto him so farre as he iudged conuenient, whome notwithstanding hee could not conceiue to remaine in the most secret mystery of Trinity in vnity, were it not by the benefit of most diuine skill in numbers, which skill as also the most full and effectuall knowledge of all other things vnspeakable, God vsed in his wonderfull Creation of all the world out of nothing, which

of that faculty, dedicated vnto you: beeing now informed to runne ouer the same both amending and augmenting it vvith sundry Additions: I am so bold againe to attempt your Worshippes with the acceptation thereof, hoping that as in fore-time yee haue taken it such as it was, yee will now also daygne to receiue it, beeing in better case (I hope) than euer it was, a token of my good will, how bee it a simple thinge, wherein you may weygh the Heart and not the Guift, proceeding from such a Fountayne, that if better skill and knowledge had beene matched to my good meaning, it shoulde haue beene done otherwise, to the better contentation of your Worthynesse. And therfore in the meane season vntill it please God to furnish mee in such sort, I rest in dayly prayer vnth him, to maintayne your fellowship in happy state, & to blesse your purposes with lucky successe, to guide your voyages with wished

wished increase, and to season your doings with all kinde of vertue, and to preserue your liues with desired health, to his will and pleasure.

(*,*)

At London the 4. day

of Ianuary. 1584.

The

and cunning conclusions therein contayned: and also that it is the Key and entrance into all other ARTS & learning: as well approoued the Noble Philosopher *Pythagoras*, who caused this inscription to be written vpō his Schoole doore (where hee taught Philosophie) in great Letters: *Nemo Arithmeticæ ignarus hic ingrediatur*: Let none enter heere that is ignorant in Arithmeticke: which saying, as it is proper and peculiar vnto all sorts of men in the beginning and entrance into all liberall knowledge and faculties to bee ensued and embraced, so surely aboue all other, it is (next after the word of God) most fit and necessary, that it should be written vppon your Schoole doores (Right Worshipfull) whose Trade and trauaile is imployed in the Noble Traffique of Marchandize, wherein you haue need of continuall recourse vnto this excellent Art. The dayly exercise whereof, hath so sharpened your iudgement, and ripened your vnderstandings,

that

that most of you are become singular therein, both to deale that way your selues, and to iudge of other mens doings, And heerein I am sure you are good witnesses with mee how foolish & vaine is their opinió, which beside your most commendable Affayres, suppose and affirme that Arithmeticke is of small vse vnto any other men, seeing that the lawes of sundry Realmes well instituted and guyded, haue deseruedly accounted for Fooles and vnfit members (to rule or deale in a common wealth,) all such as wanted the skill of naturall Arithmeticke, depriued them both of Landes and Liuing, which as it tendeth vnto no small prayse and credit of Arithmeticke, so I am constrained for breuitie sake, in few wordes to ouerpasse both that and others vvhich might bee said of commendation thereof. Shortly admonishing your Worshippes, that wheras in times past as is well known I had trauelled in a Booke in English

of

THE PROLOGVE

to the gentle Reader.

HAVING SOMEtime now twelue yeeres (Gentle Reader) published in Print one English Booke of Arithmeticke containing (as I suppose) sundry necessary & profitable documents for such as are willing to attaine any knowledge therin, I haue been often since that time, and of very late also, requested by sundry of my friends, to peruse the same worke, and as I should now iudge it expedient, to adde something more thereunto, and to amplifie the same. Which earnest and friendly suite of theirs, for certaine iust causes seeming needful vnto mee, surely I could no in wise deny.

Vnto

Vnto thee therefore my request is thankfully to accept the same, and in good part wishing well to him that trauaileth for thy benefit, not disdaining it in respect of grossenes of the stile, or rudenes of vtterance, since that this science requireth not eloquence of writing, but plainenes of teaching, & truth in marking diuers conclusions by numbers only, desiring thee, if thou be willing to profit heereby: first, friendly to amend the literall faults that haue escaped in the same, & then to begin at the entrance of the booke, & so orderly to proceed forward to the end, not turning vnto the middest or last part therof, vntil thou perceiuest well that which went before. And so doing thou shalt not only attaine to the perfect knowledg of the whole effect: But be able also by thine owne labor and industry, to vnderstand all other books of Arithmeticke whatsoeuer: And thus I bid thee farewell.

The Definition of Number.

NVMBER IS AS much to say, as a multitude composed of many vnities, as two is composed of two vnities, thrée is composed of three vnities, foure of foure vnities, fiue of fiue vnities, ten of ten, fourtéene of fouretéene, fiftéene of fiftéene, twentie of twentie vnities, &c.

And therefore an vnitie is no number, but the beginning and originall of number, as if you doe multiplie or diuide an vnitie by it selfe, it is resolued into it selfe without any encrease: But it is in number otherwise, for there can bee no number, how great soeuer it bée, but that it

may continually bée encreased by adding euermore one vnitie vnto the same.

Chap. I.

Numeration.

NVMERATION is the art whereby to expresse and declare the value of any Sum proposed: and is of Two kinds, the one gathereth the value of a summe proposed, and the other expresseth any summe conceiued by due figures and places, for the value is one thing, and the figures are another thing: and that commeth partly by the diuersitie of figures, but chiefly of the places wherein they bee orderly set. And therefore you must first marke, that there are but ten figures or characters which are vsed in Arithmeticke, whereof nine of them are called signifying figures, and the tenth is called a Cipher, which is made

made like a o, and of it selfe signifyeth nothing, but if it be ioyned with any of the other figures, it encreaseth their value, and these be they.

1	2	3	4	5	6
one,	two,	thrée,	foure,	fiue,	sixe,
7	8	9	0		
seuen,	eight,	nine,	a Cipher.		

Also you shall vnderstand that euery one of these figures hath two values: One is alway certaine and hath his signification of his owne forme, and the other is vncertaine which hee taketh of his place.

A place is called a seate or roome that a figure standeth in, and how many figures soeuer are written in one Sum, so many places hath the whole value thereof. And that is called the first place (which is next toward the right hand) of any summe, and so reckoning by order towardes the left hand, so that, that place is last, which is next the left hand. And contrariwise, when you expresse the value of the figures in any Summe, you must *A place.*

begin at the left hand, and so reckon towards the right hand.

Euery of these nine figures (which are called signifiyng figures) hath his owne simple value when hee is found alone, or in the first place of any Summe. In the second place toward the left hand, he betokeneth his owne value ten times. As 70. is seauen times ten, that is to say, seuentie, 80, is 8 times 10. ÿ is to say Eightie. In the third place euery figure betokeneth his owne value a Hundreth times. As 700. in that third place betokeneth a hundreth times 7, that is to say, 7 hundreth. In the fourth place euery figure betokeneth his owne value a thousand times. As 7000, is seuen thousand, and 8000, is eight thousand. These foure first places must be had perfectly in mind, yea and that by hart as they say, for by the knowledg of them, you may expresse all kind of numbers how great so euer they bee.

In the fift place, euery figure betokeneth his owne value Ten thousand times.

times. As 70000, is ten times seauen thousand, that is to say, seuenty thousand. In the first place, euery figure standeth for his owne value, a Hundreth M. times. As 700000, is seauen Hundred Thousand. The Seuenth place, M, M, times, or a Million. As 7000000, is seuen M, M, or Seauen Millions. And the eight place ten M, M, times, or ten millions: so that euery place toward ẏ left hand, exceedeth the former Ten times. But now for the easie reading, & ready expressing orderly of any summe proposed, you shall practise this manner following: As for example, I propose this number 765432658, In the which are ix. places. In the first place is 8, and betokeneth but eight, that is to say once his owne value: And the second place is 5, and betokeneth ten times fiue, that is fiftie: In the third place is 6. and betokeneth an Hundreth times sixe, that is 6. C. In the fourth place is 2, and that is two M. And 3, in the v. place, is ten M. times 3, that is xxx

M. So 4 in the sixt place is C thousand times 4, that is Foure C, M. Then 5, in the seuenth place is a M, M, times 5, that is fiue M, M, or rather Fiue Millions. And 6, in the eight place is six times ten Millions, that is, Lx. Millions. And last of all vij in the ix. place. is vij. C Millions. Now followeth the practise. First, put a pricke ouer the fourth figure, & so ouer the seuenth, and likewise ouer the tenth. And also ouer the 13, 16, or 19, if you haue so many, and so still leauing two figures betwéene euery two prickes, and these commes from one pricke to another, are called *Ternary* Ternaries, then you must pronounce euery thrée figures from one pricke to another, as though they were written alone from the rest. And at the end of their value, ad so many times a thousand, as your number hath prickes: (that is to say) if there be but 1 prick, it is but 1 M: if 2 pricks, 1 M, M, or else a Million: if 3 pricks, one M, M M, or a M. Millions. And so consequently

quently of all other figures following. Then come likewise to the next 3 figures, & sound them as if they were apart from the rest, and adde to their value so many times thousands, as there are prickes betweene them and the first place of your whole number. And so doe by the next 3 figures following, and all the rest likewise: as in example, 451234678567. The first pricke is ouer 8, in the Fourth place, which is the place of a M. The second pricke is ouer 4, in the seauenth place, which is the place of a M, M, or one Million: The third pricke is ouer the 10 place, which is the place of a M, M, M, or of a M, Millions, as in the former example. Then for the expressing of this number by the value of euery figure, according to the place wherein they stand, you shal first beginne at the last pricke ouer 1 and take it, and the other two figures 5, and 4, which are behinde the said 1 towardes your left hand, and value them alone, and they are foure Cli. M

M, M, or else CCCCli, M, Millions. Then take the other Three Figures from 1, to the next prick toward your right hand, and value them as if they were apart from the other, and they are 234, which doe signifie CCxxxiiij. Millions, or 234 M M. Then come to the third pricke ouer 8, and take the other two figures behind it, and reckon them likewise as if they were alone, and they are Six Clxxviij. M. And last of all, come to the other three figures which remaine, that is 567: and they are Fiue Clxvij. Thus the whole sum of these figures, is Foure Cli. M, Two Cxxxiiij. Millions, six Clxxviij. M, fiue Clxvij, as before.

Three kinds of number. Note also that whole number is diuided into three kinds, that is to say, Diget number, Article number, and Mixt or Compound number. *Diget.* The diget number, is al manner of numbers *Article.* vnder ten, which are these Nine figures, 1, 2, 3, 4, 5, 6, 7, 8, 9, of the which I haue spoken before. The Article number is any kinde which hath in

in the first place a Cipher, as this 0, and they may euer bee diuided iust by 10, without any remaine, as these 10 20, 30, 40, 50, 100, and all other such like. The Mixt or compound number containeth diuers and many Articles or at the least one article, and a diget, as 11, 12, 16, 19, 22, 38, 108, 1007, and so forth. And as any article nũber may be made a compound, by putting thereto a diget, euen so likewise euery compound number, may be made an Article number, by adding thereunto a 0. *Mixt or cōpound*

And

And here followeth a Briefe rehersall of the order and Denominators of the places. And this shall bee sufficient for Numeration.

The order of the places.		The Denominators of the places.
Tenth.	4	M. of Millions.
Nynth.	3	C. of Millions.
Eight.	2	X. of Millions.
Seventh.	1	Millions.
Sixt.	0	C. of Thousands.
Fift.	1	X. Thousands.
Fourth.	8	Thousands.
Third place.	3	Hundreths.
Second place.	4	Tenths.
First place.	5.	Unities.

Addition in whole NVMBER.

ADdition is as much as to bring together two sums or more into one, as if there were due to any man 223 li. by some one bodie: and 334 li. by another, and 431, by another: and you would know how many pounds is due to the same man in all: these thrée sums shall you set downe orderly the one vnder the other, wryting the greatest summe highest, and the next to the greatest vnder it, and the least summe vnder the last, in such sort that the first figure of ẏ one sum towards your right hand, bée directly vnder the first figure of ẏ other and the second vnder the second, and so forth in order.

When you haue thus done, draw vnder them a straight line, & they will stand thus.

	431
	334
	223

Now beginne alwaies at the first places towards your right hand,

hand, and put together the thrée firſt figures of ẏ firſt places of theſe thrée ſummes, and looke what cometh of them, & write that vnder them beneath the line, as in ſaying 3, 4, and 1, béeing put together doe make 8: write 8 vnder three, as héere you ſee.

431
334
223
8

And then goe to the ſecond places of figures, and do likewiſe: as in ſaying 2, 3, and 3, make 8, write 8 vnder 2, as héere you ſée.

431
334
223
88

And doe likewiſe with the figures that be in the third place, in ſaying, 2, 3, and 4, are 9, put Nine vnder them, and ſo will your whole Sum appeare thus: whereby you may perceiue that thoſe Thrée Summes béeing added together, doe make 988 li. And this is the Art of Addition according to his ſimplicitie, when the Sum of any place doth not excéede a diget number. But in caſe

431
334
223
988

the

the Sum of any one place cannot bee expressed by one figure, but by Two, you shall put the first of those figures vnder the line, and keepe the other in your mind, for to adde it vnto the first figure of ye next place. And if the same next place cannot bee avalued but by two figures, you must in like maner put the first of those figurs vnder the line, and reserue the second for the other place next after, and thus must you do from one place to another, vntill you haue come to the last place, where if it happen you doe finde that the sum bee of two figures, you must set them both downe because it is the end of that worke, as in this example.

734682456
450932345
13467891
4672123
1203754815

Where the first figures are, 3, 1, 5, 6, which added together maketh 15, and

for

for that, that 15 is of two figures, I doe put the first figure 5 under the line, & keepe the second figure (which is 1) in my mind, the which I must adde with the next figures of the second place, that is to say, with 2, 9. 4, and 5. the which together make 21, I write 1 under the line for the secōd figure of that addition, that is to say, after 5: and I keepe 2 to be added unto the third place, the which with the other figures, 1, 8, 3, and 4, do make 18, therefore I put 8 next after 1, in the third place under the line, & keepe 1 to bee added unto the figures of the fourth place, which is with 2, 7, 2, 2, the which with the 1 that I keepe, doe make 14: I set downe 4 for the fourth Figure (under the line) that is to say, behind 8: and I keepe 1, to bee added unto the figures of the fift place, the which is 7, 6, 3, and 8, with ẏ 1 that I keepe, maketh 25: I put 5 in the fift place, under the line next after 4: and I keepe 2, in my minde to bee added with the figures of the sixt place, that

that is with 6, 4, 9, and 6, and that 2 which I keepe, maketh 27: I write down 7 under the line in ẏ first place, and I keepe 2, which I adde with the figures in the seuenth place, and they make 13: I put downe 3 vnder the line in the seuenth place, and adde 1, vnto the figures in the eight place, & they are 10: I doe put 0 vnder ẏ line in the eight place, and then I adde 1 vnto the ninth place, that is to say, with 4 and 7, and they make 12: the which 12 I write at length vnder the line, because it is the end of this Addition, and this is to bee done of all such like. And for the easier vnderstanding of that which wee haue spoken of Addition, you may examine these two other examples following, in the which the first hath these numbers 3570, 2763, 579, & 28: which beeing added together, doe make this number 6940, and in the second example, doth result this number 51683, by adding together of these numbers 47630, 3756, 272, 25, as heere vnder written

written.

The numbers to bee added.	3570	47630
	2763	3756
	579	272
The line put betweene.	28	25
The summe of this Addition.	6940	51683

Addition of Li. S. d.

But if I haue any Sums which are composed of diuers kinds of denominatious, as 25 Li. 17 S. 4 d. and 14 Li. 13 S. 8 d. and 16 Li. 19 S. 7 d. to bee added together. I must first set downe all the said Summes the one vnder the other, as héere you sée: placing the title of Poundes right vnder the Pounds, the shillings vnder the Shillings, and the penies vnder the pennies, keeping likewise the

Li.	S.	d.
25.	17.	4.
14.	13.	8.
16.	19.	7.
57.	10.	7.

the due order of their places, in each denomination. And then I begin at the least denomination which are penies: And I say thus, 4 and 8 make 12, and 7 make 19 d. that is 1 s. & 7 d. I set downe 7 under the line against the place of penies, and I do keepe in my minde 1 s. to bee added unto the place of shillings: This done, I proceed to the sayd place of shillings saying, 1 s. that I keepe & 7 s. are 8. and 3 are 11. and 9 doe make 20: I put o under the line against 9. and do keepe 2 in my minde: Comming then unto the Tens of Shillings, I say 2 that I keepe, and 1 make 3, and 1 make 4, and 1 make 5; which are 5 Tens of shillings that is to say, 2 li. and 1 ten ouer, the which I put behinde the o towardes my left hand under the tens of shillings, and I doe keepe two li. in my minde, then I come to the place of pounds, and say 2 li. that I keepe, and 5 are 7, and 4 are 11, and 6 doe make 17 li. I do set 7 li. under ye line against 6, and doe keepe 1 in my

minde, then coming vnto the Ten of Pounds, I say 1 that I kéepe and 2, are 3, and 1 are 4, and 1 doe make 5: the which I write downe vnder the line behind the 7: And so is this Addition ended: And then the sayd thrée summes being added together, doe amount to 57 li. 10 s. 7 d. And thus is to be done of all other sums of any other denominations.

Other Examples.

225. 12. 6.	5678. 13. 9.
47. 3. 9.	608. 00. 10.
38. 18. 7.	400. 17. 11.
5. 00. 8.	56. 18. 8.
316. 15. 6.	9. 12. 7.
	6754. 03. 09.

Of

Chap. 3.

Of Substraction in whole Number.

SUbstraction teacheth how you shall substract one lesser nũber from a greater and sheweth what there doth remain after that you shall haue substracted the same, I speake not of the substracting of one equal number, from another equall unto it, for the facility thereof requireth no rule.

In Substraction are found three number, the one is the numbers from the which the Substraction is made. The second is the nũber that is to bee substracted, and the third is the number which remaineth after ẏ substraction is ended. As when I would substract 25 from 40: The said 40 is the number from the which the substraction is made, & 25 is ẏ number to bee

substracted, & 15 is the number which remayneth after you haue ended the substraction: héere followeth the practise. You shall put the lesser number vnder the greater in such sort that euery Figure of the one number, may answere vnto euery Figure of the other, orderly according to their places, and then draw a right line vnder those two numbers as you did in addition. Then must you beginne at the right hand, and take the first figure of the vndermost number, and substract that from the first figure of the vppermost number ouer it, and that which remaineth you must set vnderneath the line, right vnder the figure which you haue substarcted: then afterward take likewise the second figure of the nethermost number, and abate that also from the second figure of the higher number: the third from the third, and so foorth of all the rest till you come to the end, putting alwayes the remayne of euery figure vnder the line in his due order and place,

place, as by example, I will substract 2345, from 9876, after that I haue set them downe according to the manner aforesayd. Then beginning

9876
2345
7531

at the first place next to my right hand, I take first 5 from 6, and there resteth 1: the which 1 I set vnder the line right against 5. Secondly I substract 4, from 7, and there resteth 3: the sayd 3 I set in the second place vnder the line next after 1. Thirdly I substract 3 from 8, and there resteth 5, the which 5 I put vnder the line in the third place next after 3. Finally I doe substract 2, from 9, and there resteth 7: the which 7 I put vnder the line in the fourth and last place next after 5, and thus is this substraction ended, and there remaineth 7531.

But when two figures of one likenes doe chance to méet, so that the one must bee substracted from the other as if I should substract 7 from 7 there would remayne nothing: then must I set a Cipher, vnder the line. But

when the figure which is to bee ſub-ſtracted doth exceed ẏ figure which is ouer him, ſo that it cannot be taken out of the ſame figure. Then muſt you ſubſtract the vndermoſt figure from 10. and that which doth remaine, you ſhall adde vnto the ſame figure which is vppermoſt. And the ſumme which reſulteth of them both, you ſhall ſet vnder the line. But whenſoeuer you doe borrow any ſuch 10 of the ouer-number, you muſt adde 1 to the next nethermoſt figure following which is yet to bee ſuſtracted. And there is nothing elſe to be done in ſubſtractiō.

Example, I will Subſtract 93576. from 4037479: after that I haue placed my two numbers as I ought to do, I do firſt ſubſtract 6. from 9, & there reſteth 3, thē I put the 3, vnder the line right vnder the 6. And ſecondly, I ſubſtract 7 from 7, and there reſteth nothing: I do therfore put a cipher 0 vnder the line right againſt 7 in the ſecond

4037479.
93576.
3943903.

second place. Then I come to the third place where I find 5 which I cannot substract from the figure ouer him, which is but 4, therefore I doe substract it from 10 as before I taught and there resteth 5, the which I doe adde with the 4, which is ouer him, and ẏ maketh 9: I put 9 in the third place vnder the line for the third figure. Fourthly, for the 10 which I borrowed I adde one vnto the next Figure which is to bee Substracted, which is 3, and they make 4: the said 4 I doe substract from the ouer figure 7, and there resteth 3, I put 3 vnder the line for the fourth figure. And then I come to ẏ fift place where I do find 9. which I cannot substract frō the figure ouer him, which is but 3, but I doe substract 9 from 10, and there resteth 1, the which figure 1 I doe adde with 3, and they make 4: I put 4 vnder ẏ line for the fift figure. And here is to be noted that if it were not for that I did at ẏ last borrow 10, the substraction should haue béene en-

ded. But for because that I must (for euery such 10 that I borrow) alwaies adde 1 vnto the next lower figure following, I must therefore proceed vnto the Substraction. And for because that there is no other figure following in the lower number, it shall suffice to haue kept the vnity, & to substract it from ẏ next ouer figure, but I find there 0, and therefore I cannot substract 1 from 0, therefore I substract it from 10 and there resteth 9: which I doe put vnder the line in the first place: finally for the ten which I borrowed, I kéepe 1 in mind: The which I doe abate from 4, and there remaineth 3, the which 3 I do put vnder the line in the seuenth place after 9, and the operation is thus ended.

Another example.

$$\begin{array}{r} 576084026 \\ \underline{485675437} \\ 90408589 \end{array}$$

But if there were many numbers to bee substracted from one number alone, then must you first adde those

num-

numbers together according to the inſtruction of the Chapter going be-fore, & afterward to make your ſub-ſtraction as aboue is ſayd. As if I would ſubſtract theſe three ſummes 123, 234, 456, from 98925, firſt I doe adde the three ſummes into one, & they are 813. The which I doe ſub-ſtract from 98925, and there reſteth 98112.

But if the ſummes be compoſed of diuers kinds of denominations, then you muſt begin at the leaſt denomi-nation next toward your right hand, and ſo ſubſtract euery denomination from his like if it may be ſubſtracted, if it cannot be ſubſtracted, then you muſt borrow 1 of ẏ next denominati-on toward your left hand & reduce the ſame into the like denomination of that figure which is to be ſubſtracted, then ſhall you ſubſtract your firſt or leaſt denonmination, from ẏ ſaid ſum ſo borrowed, and that figure or num-ber that ſhall remaine, you muſt add with the vppermoſt number of the

leaſt

least denomination , and set the aggregate vnder the line right against his like. Then the 1 which you did borrow must bee added with the next figure of the next denomination that is to be substracted, and so to procéed with the whole summe that is to bée substracted. Example.

I would substract 15 li. 17 s. 11 d. from 28 li. 13 s. 9. d. I do first put downe the greater sum, & vnder that the lesser with a line vnder them, as here you sée, and then I doe begin at the least denomination which are penies, where I say 11. penies from 9. pennies, I cannot. And therefore I do borrow 1 s. of the next denomination that is of the 13 s. the which 1 s. is 12 penies: Then I substract 11 penies from 12 penies, and there remaineth 1 penie, the which 1 penie I do adde with 9 penies, and they make 10. penies: the sayd 10 I set vnder the line & do kéepe the 1 s. in my mind that I borrowed,

li.	s.	d.
28.	13.	9.
15.	17.	11.
12.	15.	10.

borrowed, then come I to the ſecond denomination of ſhillings, where I doe find 17 s. then I ſay 1 s. that I borrowed and 17 doe make 18 s: the ſaid 18 s. out of 13 s. cannot be, therfore I borrow 1 li. of the next denomination, that is to ſay, out of the 28 li: and the ſaid 1 li. are 20 s. then I ſubſtract 18 s. from 20 s. and there remayneth 2 s. with the which I do ad the to 13 s. and they doe make 15. the ſame 15 s. I ſet vnder the line and I do kéepe 1 li. to be added to the lower place of pounds: then I ſay 1 li. that I kéepe, and 5 are 6: I Subſtract 6 li. from 8 li. & there remains 2. I ſet the ſaid 2 vnder the line againſt 5: and laſt of all, I come to the tens of Pounds where I do find one, then I doe ſubſtract that 1 from 2, and there remaineth 1, which I ſet vnder the line, & ſo I find there remaineth 12 li. 15. s. 10 d. and ſo is it to bee done of all other like.

Of

Of Multiplication.

IN Multiplication there are iij. numbers to bee noted, that is to say, the number which is to be multiplied, ÿ which wee will call the Multiplicand: the second is the number by the which we do multiply which wee will name the multiplier, or multiplicator: & the third number is that which cometh of the multiplication of the one by ÿ other, which is called the product. As when I wold know how much amounteth 10 multiplied by 9, that is to say, how much are ten times nyne, I find that they are worth 90, then Ten is the multiplicand, & 9 is the multiplier, and 90 is called the product. So that to multiply is none other thing, but to find a nūber which containeth the multiplicand so many times, as the multiplier containeth vnities: As 10 multiplied by

9 doe

9 doe make 90 as before is said. And 90 containeth 10 so many times, as 9 containeth vnities, that is to say, 9 times. In Multiplication, it forceth not much which of the two numbers bée ẏ multiplicand, nor which bee the multiplyer. For 10 multiplyed by 9, maketh as many, as 9 multiplyed by 10, yet neuerthelesse it shall be more commodious that the lesser number be alwaies the multiplyer.

And for that, that the multiplication of figures the one by ẏ other, is ẏ chiefe & necessariest kind whereby to know how to worke in the multiplication of compound numbers, and that euery man hath not the same at their fingers end, I will therefore giue you here certaine easie waies of multiplication of diget numbers. When you would multiplie two simple figures, or digets ẏ one by the other, substract each of those diget numbers from 10. Then multiply the two remaines the one by the other, and if the Sum doe excéed 10, write onely the first figure,

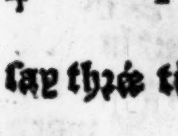
and

and keepe the other to be added to the next operation, which is thus as followeth. Adde your 2 simple figures together, & of ye which resulteth of the addition, take only the 1 figure, unto the which you must ad ye unitie which you did keepe before. And that shall be the second figure of ye sum which you do seeke, Exam: I would multiply 7, by, 6 I take 7 from 10 & there resteth 3: likewise I substract 6 from 10, and there resteth 4. thē I say thus 3 times 4 make 12: I write 2 for my first figure, and keepe 1 in mind: then I ad 6 with 7, and they are 13: of the which I cast away the second figure toward my left hand which is 1: and I take onely the first figure 3 which is toward my right hand, unto the which I ad the unity which I kept, and they make 4, which I write in the second place after 2, & thus I find 42 which is the valure of 7 multiplied by 6.

Otherwise, and all commeth to one effect: set downe your two diget numbers the one right over the other, and

right

right against euery of them towards the right hand write his owne difference from 10. Then multiply ye two differences together, the figure which commeth thereof, shall you set downe vnder both the differences if it be a diget number, that is to say, any number vnder 10. But if there be 2 figures set downe but the first, and keepe the other in your mind, afterwardes substract (from one of the two diget numbers) that were first set downe, ye difference of ye other diget number, that is to say, crosse-wise. And vnto the remayne ad the figure which you kept before: & that shal be the second number, & thus shall you haue your multiplicatiō. Example of the same figures that is to say, of 7 multiplied by 6, the difference of 7 from 10. is 3: and the difference of 6 from 10, is 4: I set them downe crossewaies as you see: And then I say three times foure are 12. I set downe



downe 2, and keepe 1 in my minde, then I substract 4 from 7, or else three from 6, it forceth not, from which of them; & there resteth alwaies 3: unto the which I adde the unitie which I kept in my minde, and they are 4, which shall be the second figure of the multiplication. And thus I find that 7, multiplied by 6, maketh 42: as in the other operation. This practise hath no place where the 2 diget numbers (doe not exceed 10,) by adding them together, and then is multiplication easie inough without any rule.

Another way to know the multiplication of simple numbers, is by this table following: the use whereof is thus.

First you shall understand that the numbers from 1, and so descending downe-wards to 9, which are set in the left part or hanging margine of this table, doe betoken the multipliers of all simple numbers. And the elements or figures being put highest in every square roome drawing to-

ward

toward your right hand, right against euery of the multipliers, doe signifie the multiplicands, which doe appertaine vnto the multipliers of ẏ hanging margine. And the lower or inferior numbers in euery square roome, do betoken the product of that multiplication, which is made in multiplying the vpper number ouer it, with the figure in the hanging margine, answering directly vnto the sayd square: as by example.

***

The Table of Multiplication by all the Diget NUMBERS.

1	1 1	2 2	3 3	4 4	5 5	6 6	7 7	8 8	9 9
2	2 4	3 6	8 4	5 10	6 12	7 14	8 16	9 18	
3	3 9	4 12	5 15	6 18	7 21	8 24	9 27		
4	4 16	5 20	6 24	7 28	8 32	9 36			
5	5 25	6 30	7 35	8 40	9 45				
6	6 36	7 42	8 48	9 54					
7	7 49	8 56	9 63						
8	8 64	9 72							
9	9 81								

First

First because 1 doth not multiply, I haue set in the vpper margin the figures from 1 to 9: both in the higher and also in the inferiour rowes, for 1 in the hangin margine, multiplied by 1, the vpper nūber in the first square bringeth but 1. So likewise 2 being the higher number in ẏ second square of the vpper margine, multiplyed by 1 in ẏ hanging margin, bringeth 2 for the lower nūber in the second square of the vpper margine: For 1 times 1 maketh but 1: and 1 times 2 maketh 2. Then 1 times 3 maketh 3: and 1 times 4 maketh 4. And so continuing toward the right hand, vntill I come to ẏ figure of 9 which is 1 times 9 maketh 9. Then afterwards I multiply 2 of the hanging margine by 2 which is the vpper number of the square next toward the right hand, & that maketh 4 which is the product of 2 multiplied by 2, that 4 I set vnder ẏ 2, for 2 times 2 are 4: and 2 times 3 maketh 6: then 2 times 4 maketh 8 and 2 times 5 maketh 10, and so

continuing vnto 2 times 9, which maketh 18. The like is to bee done with the third row, and so likewise of all the residue.

Example, I would know what is the product of 9, multiplied by 8. I seek in the hanging margine the multiplier 8, and amongst the squares directly against 8, drawing toward the right hand, I seeke the multiplicand 9, in the higher row, and I find the product right vnder 9, to be 72: Then 72, is the number which commeth of the multiplication of 9 by 8. And so is to be vnderstanded of all the rest of the table. Which table must be (of all men) learned by heart, or as they say, without booke: which being learned you shal the better attaine to the rest of multiplication.

To come now vnto the practise of multiplication; when you would multiply two numbers, the one by the other, you must set them down after ẏ same manner as you did in addition, and in substraction: that is to say, the

first

firſt figure of ỹ multiplier vnder the firſt figure of the multiplycand , the ſecond vnder the ſecond, and the third vnder the third, if there ſo many, & then drawe a right line vnder them, as in the other operations going before. After this, you ſhall multiply all the figures of the multiplicand by the multiplier , and ſet downe the figures (comming of any ſuch multiplication) vnder the line, euery one in their due order and place.

Examp. I would multiply 1 2 3 by 3, that is to ſay, I would know how much amounteth 3 times one Hundreth twenty and thrée, the two nũbers being placed in ſuch order as is before ſaid, you muſt begin towards the right hand : and ſay thus,

$$\begin{array}{r} 123 \\ 3 \\ \hline 369 \end{array}$$

3 times 3 are 9 : write downe 9 vnder the line right againſt 3, for the firſt figure : ſecondly by the ſame 3, you muſt multiply the ſecond figure 2, and they doe make 6, and I doe put 6 after the 9, vnder the line: Thirdly by the ſame

3, you shall multiply the last figure 1 and they are but 3, set downe 3 after 6 for the third and last figure. And thus is the worke ended: wherby you shall finde that 123 being multiplied by 3 maketh 369.

But when it happeneth that of the multiplication of one figure by another, the sum which commeth thereof shall bée of two figures, as it happneth often, then shall you write downe the first figure, and kéepe the other figure to be added unto the multiplication of the next figure.

Example, 6 men haue gained (euery one of them) 345 Crownes, I would know how many Crownes they had in all. First I multiplie 6 by 5, they make 30. I write 0 under the line and for 30 I doe kéepe 3 to be added to the next multiplication. Secondly, I say 6 times 4, are 24: unto the which I adde 3, which before I reserued: And they wake 27. I write 7 in the second place

$$\begin{array}{r} 345 \\ 6 \\ \hline 2070 \end{array}$$

under

vnder the line, and I kéep 2 to be added to the next Multiplication: Thirdly, I say 6 times 3, are 18, vnto the which I adde the 2 which I kéepe, and they make 20, the which I write all downe, for because that is the last worke. And so I find that 345, béeing multiplied by 6, doe make 2070. But when the multiplier is of many Figures, you must Multiply all the whole Multiplicand by euery one of these figures, & write ẏ products euery one orderly vnder his owne figure.

Example, I would know how many daies are past frō the Natiuity of Iesus Christ vntil the yéere 1560, full compleat. I must now multiply 1560 by 365 daies, because there are so many daies in one whole yéer. The leap yéeres being not reckoned, which haue euery one of them 366 dayes.

Therefore first by the Figure 5: I multiply all the higher figures, saying thus, 5 times 0 maketh 0: I write 0 vnder the line for

$$\begin{array}{r} 1560 \\ \underline{365} \\ 7800 \end{array}$$

the first figure, and because I keepe nothing for the next place, I proceed and say 5 times 6 are 30: I set 0 under the line for the second figure, and I keepe 3 to be added to the next multiplication: Thirdly I say 5 times 5 are 25: The which with the 3 that I keepe are 28: I set downe 8 for the third figure, and keepe 2 to bee added with the next multiplication: Then comming unto the fourth and last figure, I say 5 times 1 are 5: the which with the 2 that I reserued are 7: I put 7 for the last figure of the first worke by the figure 5, with the which figure I haue no more to do. And therefore I cancel the same 5 with a litle strike through it, to signifie that I haue finished with that figure. And forasmuch ẏ in multiplication there is alwaies as many simple operations, as ẏ multiplyer contayneth figures, there resteth yet 2 works to be made. I come therfore to the second worke which is ẏ figure 6, by the which I must again multiply all the figures of the multyplycand

plycand as I did by 5, and the first figure (which shall be produced) I doe put one ranke more lower thã the figures of the worke now last made by 5, not right vnder the first figure of yͤ multiplyer 5, but vnder 6: that is to say, one degrée or place néerer toward the left hand: & one ranke more lower than the first worke: And I must put afterward euery of the other figures which cometh of the same multiplication in their order: thirdly I do make the multiplication by the third figure & that which shal come therof I must set in his ranke, as héerafter shall appeare. And now I néed make no further discourse héerof, because that hée which can doe the first multiplication by 5, may as easily doe all the others. It shal therfore suffice to set hereũder the exãples of all the 3 sundry works.

	1560	1560
1560	65	356
5	7800	9360
7800	9360	7800
	101400	4680
		569400

Now, if you will know how much all the three workinges thus placed, do amount vnto, which in value must be but one number: you must adde all the numbers which are come of al the 3 multiplications together, but not after the same manner as we haue done in the Chapter of Addition, the first figure of the first ranke with the first figure of the second ranke, and so of the third: but you must adde them in the same sort as you shall finde them scituated & placed: that is to say, the first figure of the first ranke alone by it selfe: the second of the first rancke with the first of the second rank. The third of the first ranke with the secõd figure of the second ranke, and with the first of the third ranke, & so of all the other as heereafter doth appeare.

And thus the 1560	1560
yeares doe contayne	365
Fiue hundreth sixty &	7800
nyne Thousand foure	9360
Hundreth dayes, not	4680
counting heerein the	569400
	daies

dayes of the leape yéeres, which are héere in number 390, for then ẏ whole sum of the dayes should be 569790.

Another Example.

34560
2456
207360
172800
138240
69120
84879360

The Summe of Multiplication is thus, when you would multiply any number by 10, you shall only put one cipher 0 before all the numbers, that is to say, a degrée néerer to ẏ right hād as 345 multiplyed by 10, maketh 3460. If you will multiply any nūber by 100, adde to the same number two ciphers thus, 00, if by 1000, adde 000. And to be briefe, when the last figure of the multiplier is 1, and all the rest bee ciphers, adde so many ciphers to your multiplicand, as there shall bee

found

found Ciphers in your multiplier. But if in your multiplying, the last figure were not, but that there were onely certayne Cyphers in the beginning: and that the other were signifying figures, and likewise those of the multiplicand, then shal you put those Ciphers apart, and multiply the signifying figures of the other. Then adde unto the product of that multiplication, all the Ciphers which you did before put apart. As if I would multyply 46000 by 3500. I put apart the three Ciphers of the first, and the two ciphers of the second numbers, which are in all 5 ciphers 00000: And then I multiply 46 by 35, and therof commeth 1610: Before that which toward the right hand, I ad the 00000 that I did put apart, and then the whole product will be 161000000.

46
35
230
138
161000000

Of

Of Diuision.

Diuision or Partition is, to seeke how many times one number doth contayne another, or else how often times one number may bee found in another, for in the worke of Diuision there are required two nũbers, to be first knowne, for the finding out of the third The first number knowne, is called the diuidend or number which is to be diuided, & that must bee the greater number. The second number is called the diuisor, and that is the lesser. And the third number which I doe séeke, is called the quotient. As if I would diuide 36 by 9, the diuidend shall bee 36, and the diuisor is 9. And for because that 9 is contayned in 36, 4 times, that is to say, 4 times 9 doe make 36, the quotient shall be 4, as if you marke well, how many times 9 is contained

tained in 36, you ſhall find it 4 times: and therefore 4 ſhall be the quotient.

The practiſe.

Write downe firſt the diuidend in the higher number, and the diuiſor vnderneath in ſuch ſort, that the firſt Figure of the diuiſor toward the left hand, be vnder the firſt figure of the diuidend, and euery figure of the ſame diuiſor vnder his like, that is to ſay, yͤ firſt vnder the firſt, the ſecond vnder the ſecond, the third vnder the third, and ſo conſequently of the other, if there bee ſo many, which is contrary to the other thrée kindes before ſpecifyed: but yet you muſt cōſider further if all the lower figures of the diuiſor, may be taken out of yͤ higher figures of the diuidēd by the order of ſubſtraction or not. The which if you cannot do, then muſt you ſet the firſt figure of the diuiſor (toward the left hand) vnder the ſecond figure of the diuidend, and ſo conſequently the reſt in their due order, if any bée to be ſet downe.

euery

euery one of them vnder his like, as before is sayd. And then draw a line betwéene the diuidend and the diuisor. And at the end of them another crooked line, behind the which toward the right hand shall bée set your quotient. As by this example following, where the diuisor is but of one figure.

If you would diuide 860 by 4, you must set downe 4 vnder the 8 with a line betwéene them as here vnder you may sée.

The Diuidend.	860
The Diuisor.	4

And then you must séeke how many times the diuisor 4 is contayned in ẏ higher nũber, that is to say, in 860, ẏ diuidend answering to him, as in this our example, I must séeke how many times 4 is cõtained in 8, in the which I find it 2 times, then I write down 2 apart behind the crooked line as here you may sée, which shal be the first figure of the quotient to come, secondly by this figure 2 (beeing

thus

thus put apart) I muſt multiply the diuiſor 4; and vnder the ſame multiplication, I muſt ſet that number which cometh of the ſame multiplication: as 2 times 4 doe make 8, y which 8 I do ſet vnder the diuiſor 4. Thirdly, I do ſubſtract the product of the ſaid multiplication (of the quotient by the diuiſor) that is to ſay, 8 from the higher number correſpondent to the ſame, in ſaying 8 from 8, there remaineth nothing, & then I cancell or ſtricke out that which is done as you ſee In theſe thrée operations and workes is comprehended the Art of Diuiſion. The which are to bee obſerued from poynt to point, for there is no diuerſity in y finiſhing of the ſame, which is thus.

860
4 (2
8

Now ſecondly, I muſt remooue my diuiſor one place néerer toward my right hand, as in procéeding with our examp. Héere you ſée I remooue my diuiſor, 4, which was vnder 8, and I ſet it vnder 6, then I ſéeke how many times

2
860(21
4

times

4 is contained in 6: where I find it but one time, then I set 1 behind the crooked line next unto the first figure of the quotient 2, a degree or place nearer my right hand, afterward by this last & new figure 1, I multipy ỳ diuisor 4, & that maketh but 4 (for an unity which is but 1, encreaseth nothing) I abate therefore 4 from the higher figure 6, & there resteth 2, the which 2 I set ouer the 6: and I cancel the 6, for so I must do whẽ there resteth any thing after I haue made the substraction. Thirdly, for as much as there yet remaineth another figure in the diuidend, I remoue again ỳ diuisor & I set it vnder the cipher 0. Then I seeke how many times 4 is in the higher number, which is 20, where I may find it 5 times, I put therefore 5 behind the crooked line for the third and last figure of the quotient. Then

```
   2
 8 6 0 ( 215
 ---------
   4
   2 0
```

by the same 5, I multiply ỳ diuisor 4 and that maketh 20, the which 20 I

abate from the higher nūber, & there resteth nothing. And so is the diuision ended: & thus I haue found that 860 being diuided by 4, bringeth for the quotient 215: that is to say, that 4 is contained in 860, two hundreth & fifteene times. This is the most easiest working that is in diuision, but that which followeth appertaineth to the whole and perfect vnderstanding of the same. When the first figure of your diuisor toward your left hand is greater than the first of the diuidend, you must not place the first figure of your diuisor right vnderneth the first of the diuidend, but vnder the second figure of the same diuidend, neerer to your right hand, as before is sayd. Therefore when the diuisor is of many figures, and that you haue to seeke how many times it is cōtained in the higher number, (for the more easier working) you must not seeke to abate the diuisor all at one time, but you must see & mark how many times the figure of the same toward the left hād

is

is contayned in the higher number answering to the said number, & then to worke after the same manner as is before taught.

Example, I haue 316215 crownes to be diuided among 45 men, and for to make my diuision, I must not put the first figure of the diuisor which is 4, vnder the first of the Diuidend, which is 3, because that 4 is a greater number than 3. And further, you know, that I cannot take 4 out of 3, wherefore I must set the 4 vnder the second figure of the higher number, that is to say, vnder 1, and the figure 5 of the diuisor, right vnder the 6, as héere you may sée.

So that I must first séeke, how many times 45, is contayned in 316, which is but apart of the Deuidend. Wherefore for ẏ more easy working I néed but to séeke how many times 4 is contained in 31. And because I may haue it 7 times, I put 7 behind the crooked line, as is aforesaid: then

316215
45

by 7, I multiply all the diuisor 45 and they are 315: the which I set vnder ẏ same diuisor the first figure vnder the first: and the other in order towards the left hand. Then I substract 315, from the higher number 316: and of this first working there remayneth but 1, the which I set ouer the 6, and I cancell likewise the 315, and the other figures 316, and also the diuisor 45: and then it will stand thus as in the margent.

```
  1
316 215
--------
45    (7
315
```

And when I come to remooue the diuisor, and that I must séeke how many times it is contayned in the higher number, if I sée that I cannot find it there, that is to say, that if the higher number, be lesser thã the diuisor, as it is in this example, then must I put a cipher in the quotient behind the crooked line, and if there remaine any figures in the diuidend which are not yet finished: I must remooue the diuisor againe néerer toward my right hand

hand by one place, for to find a new figure in the quotient. As in this our example, for after that I haue remoued the diuisor, I seeke how many times 45, is contayned in 12, and because I cannot haue 45 in 12, I put

```
  1
31 6215
-------
 45 (70
```

a 0 behinde the crooked line after 7: thẽ without multiplying or abating, I remoue againe the diuisor néerer towards my right hand, and I séeke how many times 4 (which is the first figure of the diuisor) is in the higher number, that is to say in 12, whereas I find it 3 times: I put 3, behinde the crooked line, for the third figure of the quotient:

```
   1
316215
--------
  45(703
  135
```

then by the same figure 3, I multiply the deuisor 45, and thereof commeth 135. And in the number ouer it there is but 121, so that I cannot take it out of 121, which is the lesser number. And therefore héere is to be

noted, that if it happen, that the figure being last found which is put in the quotient, doe produce or bring forth a greater number (in multiplying all the diuisor by the same) than ẏ which is ouer the said diuisor: you must then make the same figure of your quotiẽt (which you doe put downe) lesser by 1, and after that you haue cancelled the first multiplication, you must make a new. And the same must be done so oftentimes: as (in decreasing the same) it may produce a lesser number, or at the least a number equal to that which is ouer it, as in the last worke, for because that the diuisor, being multiplyed by 3, bringeth 135, which amounteth to more than 121. Therefore the same product must bee cancelled, and the figure 3 which I did put in the quotient, must be also changed into a figure of 2. Then by the said 2, I must multiply the diuisor 45, and therof commeth 90, the which I abate from 121, and there remaineth 31. And then will the sum

stand

stand thus as followeth.

1 3

3 1 6 2 1 5
4 5 2
1 3 5 (7 0 2
9 0

And héere is also to be noted, that the summe which remaineth must bée alwaies lesser then the diuisor. Then finally, I remoue the diuisor to the 2 next figures towards the right hand, and I séeke how many times 4 is in 31, and for because I find it 7 times, I put 7 in the quotient, by the which I multiply the diuisor, and theereof commeth 3 1 5, the which I abate from the higher number of the Diuidend, and there remaineth nothing as héere you may sée.

1 3
3 1 6 2 1 5
4 5 (7 0 2 7
3 1 5

But if it happen that after the diui-

ſion is ended, there doe remaine any thing in the diuidend, as oftentimes there doth; I muſt alſo ſet them that remaine apart behind the crooked line, after the entire quotient, and the diuiſor right vnder the ſame remaine, with a line betweene them both. As in this diuiſion following, where there remaineth 3 in the laſt worke. And what the ſame doth ſignifie ſhall bee taught vnto you when I ſhall treate of fractions or broken numbers.

i.

11
467859
456 (1

ij.

11
467859 (10
456

iij.

2
2273
467859
456
222 (102

iiij.

2
22733
467859 $\frac{3}{456}$
456 (1026
2736

In

In summe, all the whole practise of diuision may be kept in remembrance by thrée letters, that is to say: S, M, and A, which thrée letters do signifie, to séeke, to multiply and to abate.

First, I must séeke how many times the diuisor is contayned in the higher number: then by the quotient (which I find) I must multiply the diuisor: finally, I must abate the product of that multiplication, from the higher number correspondent to the same, that is to say: out of the diuidend, answering to the diuisor.

And further, besides this kind of working in deuisiō: The which is regular and commune; I will héere put another maner of working very easy The which shall serue for such diuisions as are more difficil to be wroght. That is to wit, when ẏ number to be diuided is very great, and the diuisor great also, and it shall serue again for to auoid errour in supputation, and for the placing of fewer figures in the quotient: & consequently it shall saue

much

much labour vnto them which as yet haue not much studyed in this Art. The practise wheereof is thus as followeth.

If you would diuide 7894658, by 643. First you shall vnderstand, that although the figure of the diuisor toward your left hand, may bee found many times in the higher number, as 10 times, 12 times, or more: yet is it so, that you must neuer put but one figure onely at a time in your quotient. And you shall at no time put any number in your quotient which exceedeth the figure of 9, that is to say, any number beeing greater than 9. And theerefore for to come vnto your practise, write downe your diuisor one time, and behind it towards your right hād, draw a line down straight, and right against the same diuisor behinde the line toward the right hand, put this figure 1. Then double your said diuisor, and right against the same which you haue doubled, put behinde the line the figure of 2. This done

done, you shall ad vnto the same number that you doubled your sayd diuisor, and right against the same product behind the line you shall put the figure of 3, and vnto this third product you must adde againe your diuisor, and right against the same product behind the line, set the figure 4. And thus must you doe vntill you come to the figure of 9, in such sort, that euery of the products doe surmount so much his former number, as all the diuisor doth amount vnto: placing at the right side of euery product behind the line, the number which signifieth how much he is in order. That is to say, right against ỹ fift product, you must put 5, and right against the 6 product, you must put 6: and so likewise of all the other.

The Example followeth in the next page.

Example of the diuisor proposed, 643: First of all I write downe 643 and right against the same behinde the line toward my right hand, I put 1: Secondly I double 643, and they make 1286: and right against that Sum behind the Line, I put 2. Thirdly vnto that same 1286, I adde the diuisor 643, and they are 1929, and right against the same I set 3. Fourthly, vnto the said 1929, I ad the diuisor 643, and they make 2572 : and right against the same, I put 4. And thus must you doe alwayes by encreasing so much every product, as the diuisor doth amount vnto, vntill you haue so done nyne times, as you see in this present table

643	1
1286	2
1929	3
2572	4
3215	5
3858	6
4501	7
5144	8
5787	9

This beeing done, you must set downe your diuisor vnder the diuided

7894658,

7894658, after the same maner as is before declared: that is to say, 643, vnder the 3, first figures of the diuidend toward your right hand, namely vnder 789. Then must you seeke how many times 643, are contained in 789: And for to know the same, you must look in the aforesaid table if you may there find the same number 789, the which is not there. Theerefore you must take a lesser number, the neerest to it in quantity that you can find in the table, the which is 643, which number hath against it on the right hand of the line, this digit 1. Then take the sayd 1, and put it behind the crooked line, for the first figure of the quotient.

Then you must abate 643, from 789, and there will remaine 146, the same shall you put ouer the 789, and cancell the 789: and thus is the first worke ended. Then set forward the diuisor one figure neerer to your right hand, and seeke a new quotient as you sought this, where you find the

higher

higher number ouer your diuisor to bee 1464. The which seeke in the Table, & for because you cannot find it there, you must take a lesser nūber the neerest to it that you can find, and that is 1286: which number hath against it this diget 2. Therefore you must put 2, for the second figure of the quotient behind the line, and then abate 1286, from the said 1464, and there will remaine 178. Thirdly, remoue forward the diuisor as you did before, and you shall find the higher number ouer it to be 1786, so that the next lesser number to it in your table, is againe 1286, put therefore once againe 2, in the quotient for the third figure: and abate the said 1286, from 1786, so there will remaine 500.

Fourthly, set forward the diuisor: & the higher number ouer it, is 5005, and ẏ next lesser number to it in your table, is 4501, right against the which is 7, put 7 in the quotient, for ẏ fourth figure. And after that you haue abated 4501, from 5005: there will remaine

maine 504. Finally remoue forward your diuisor vnto the last place, and you shall find the higher number ouer it to be 5048. And the next lesser number to it in your table, is 4501. Therefore set 7 againe in the quotiẽt for the fift and last figure. Then substract 4501. from 5048, and there will remaine 547: which must bée put at the end of the whole quotient, wᵗ the diuisor vnder it, and a line betwéene them, in this manner following.

(12277 $\frac{547}{643}$

The Summe of Diuision.

When you would diuide any number by 10, you must take away the last figure next towards your right hand, and the rest shall bée the quotient. Example: As if you would diuide 46845, by 10: take away the 5. and then 4684 shall be the quotient, & the 5 shall be the number that doth remaine. Likewise when you would diuide any number by

100,

100, take away the two last figures towards your right hand, and if you would diuide by 1000; take away thrée figures, if by 10000, take away foure figures. And so of all other, whẽ the first figures of the diuisor toward the left hand shall be onely 1, and the rest of the same diuisor being but Ciphers.

Heere follow the proofes of Addition, Substraction, *Multiplication*, and *Diuision.*

The proofe of Addition.

WHen you would proove whether your Additiõ be well made, consider the figures of the numbers which be added, euery one in his simple value, not hauing any regard to the place where he standeth, but to reckõ him as though he were alone by himselfe,

ſelfe, and then reckon them all, one after another, caſting away frõ them the number of 9. as oft as you may. And after your diſcourſe made, keep in mind the ſame figure, which remaineth after the Nynes be taken away: or elſe ſet the ſame in a voyde place at the vpper end of a line. For if your addition bee well made, the like figure will remaine, after that you haue taken away al the nines out of the totall ſum of the ſame Addition, as oftentimes, as you may there finde any: as in this Addition which heere you ſee there remaineth 2, for each part.

24567	2
5329	
481	
30377	2

The proofe of Subſtraction.

ADde the number which you doe ſubſtract, vnto the number which remaineth after the Subſtraction is made, and if the totall ſumme of that addition bee like vnto the number,

from the which the substraction was made, you haue done well, otherwise not: as in this Example doth appeare where you see the number which is to bee substracted from 5463, is 3584, and the number which doth remaine is 1879 the which 2 sums beeing added together doe make 5463, which is like to the higher number, out of the which the substraction was made, as before is said.

5463
3584
1879
5463

The proofe of Multiplication.

THe proofe of Multiplication, is made by the help of diuision. For if you diuide the number produced of the multiplication, by the multiplyer you shall find the higher nūber which is the multiplicand.

The proofe of Diuision.

TO know if your diuision be well made, you must multiply all the quotient by your diuisor, and if any thing doe remaine after your diuision is made, the same you shall adde vn-

to

to the product which commeth of the multiplication, and you ſhall find the like nũber vnto your diuidend, if you haue well diuided: otherwiſe not.

Chap. 6.

Of Progreſsion.

Progreſsion Arithmetical, is a bréef and ſpeedy aſſembling or adding together of diuers figures or nũbers, euery one ſurmounting the other continually by equall difference, as 1, 2, 3, 4, 5, &c. Here the difference, from the firſt to the ſecond, is but of 1, and ſo doe all the other, euery one excéed his former figure by 1 ſtil to the end. Likewiſe 2, 4, 6, 8, &c. doe procéed by the difference of 2. Alſo 3, 6, 9, 12, &c. doe euery one differ from other by 3. And ſo may theſe numbers continue, infinitelie after this order, in adding vnto the 3 number, ẏ quantitie wherin the 2 doth differ from the 1: Likewiſe adding the ſame difference vnto the 4 nũber, alſo to the 5, and ſo vnto all the other: as 1, 4, the difference of the ſecond to the firſt is thrée, adde

Progreſsion Arithmeticall.

3 vnto 4, and they are 7 for the third number. Then ad 3 vnto 7, and they make 10 for the fourth number, and so of all other.

Then if you will adde quickly the number of any progression, you shall doe thus, first tel how many numbers there are, and write their sum downe by it selfe, as in this example, 2,5,8,11 & 14, where the number of their places are 5 as you may sée, therefore you must set downe 5 in a place alone as I haue don héere in ŷ margent. Then shall you adde the first number & the last together, which in this example are 14 and 2, and they make 16, take halfe thereof which is 8, and multiply it by the 5 which I noted in the margent, for the number of ŷ places. And the summe which amounteth of that multiplication, is the iust Summe of all those figures added together. As in this example: 8 multiplyed by 5 do make 40: And that is the totall Sum of all the figures. Another example of parcels ŷ are euen, as thus 1,2,3,4,5

5

and

and 6. So that in this example you must likewise note downe the number of the places, as before is taught, and then ad together the last number and the first. And the Summe which commeth of that Addition, shall you multiply by halfe the number of the places which before are noted, and that which resulteth of the same multiplication, is the whole summe of all those figures, as in this former example, where the number of the places is 6, I note the 6 apart, and then I adde 6 and 1 together: which are the last and first numbers, & they make 7, the which I multiply, by 3 which is halfe the number of places, & they make 21. and to so much amounteth all those figures added together.

Questions done by Progression Arithmeticall.

1 A Marchant hath sold 100. kersies after this manner following, that is to say, the first péece for

1 s. the ſecond peece for 2 s. the third for 3 s. and ſo forth riſing 1 s. in euery peece of Kerſey vnto the Hundreth peece. The queſtion is to know, how much he ſhall receiue for the ſaid 100 peeces of Kerſeis? Anſw. It behooueth you to know the addition of the 100 termes in this progreſsion: And therefore you muſt adde 1 s. which is the price of the firſt peece with 100 s. which is the price of the laſt peece, & thereof commeth 101. the ſame 101 you muſt multiplie by halfe the number of places, that is to ſay, by 50, and thereof commeth 5050 s. which being diuided by 20 s. thereof will come 252 li. 10 s. 0 d. which is 2 li. 10 s. 6 d. a peece, one with another. Thus the 100 Kerſeis are ſould by the ſaid Marchant for 252 li. 10 s. 0 d. The practiſe followeth.

100		
1	1 1	
101	5050	(252 li. 10 s.
50	2220	
5050		

Queſtions of Progreſsion.

1 I would lay 100 Stones or other thinges in a right line, and euery of the ſaid ſtones to be a iuſt pace one from another: & one pace from off the firſt ſtone, there ſtandeth a Baſket. I demaund how many paces a man ſhall goe in gathering vpp the ſayd ſtones, and bearing them vnto the basket, ye 1 ſtone after the other? Anſ. Firſt when he fetcheth the firſt ſtone and putteth it into the Basket, hee maketh 2 paces, for the ſecond 4 paces, for the third 6 paces, for the 4, 8: & ſo forth vnto the laſt ſtone: wherfore the laſt terme ſhall bee 200, vnto the which you muſt adde the 1 terme which is 2, & they make 202, whereof the halfe is 101, the which you ſhall multiplie by 100, which is the number of the termes in your progreſſion or elſe multiplie 202 by 50, which is halfe the number of paces, and thereof will come 10100 paces, and ſo many paces ſhall he goe in all.

Questions of Progression Arithmeticall.

3 There is a messenger which goeth euery day 8 miles: another man followeth him incontinently, & he goeth the first day 1 mile, the second day 2 miles, the third day, 3 myles, and so encreasing his iourney, euery day one mile by naturall progression. The question is to know in how many daies the second man shall haue ouertaken the first. Answere. You must consider that 8 is the middle or halfe as well of the termes, as of the number of the dayes: And therefore double 8 & therof commeth 16: subtract 1, and there will remaine 15: and in so many daies shal he haue ouertaken the first messenger. The proofe therof is very easy. If the second had gone the first day 2 miles, the second day 4 myles, the third day 6 myles, and so encreasing euery day his iourney, by 2, in how many daies should he haue ouertaken the first man, for to do this you

you muſt perceiue that 8 is the middle and fourth terme. Therefore double 4 and they make 8, from the which ſubſtract 1, and there remayneth 7, and in ſo many daies he ſhould haue ouertaken him.

Queſtions of Progreſſion Arithmeticall.

¶ THere is one man departeth from London to Cheſter, and ſo to Carnaruan, the diſtance béeing about 200 myles: hee goeth the firſt day 1 myle, the ſecond day 2 myles ÿ third day 3: and ſo orderly by naturall Progreſſion. Another man departeth at the ſame inſtant from Carnaruan to London, and goeth the firſt day 2 myles: the ſecond day, 4 myles: the third day 6 myles: and ſo encreaſing euery day 2 myles. The Queſtion is, to know, in how many daies they two perſons ſhall méete together. Anſwere. Firſt, you muſt conſider, that hée which goeth by Progreſſion natu-

naturall, maketh but halfe the way y^t the other doth, so that hee shall haue made but the one 3 part of the way, at their meeting together. Take therfore the $\frac{1}{3}$ part of 200, and you shall haue 66 $\frac{2}{3}$. Then must you seeke 2 nūbers, whereof the greater of thē, may be double vnto the other, lesse 1: & that y^t 1 of thē beeing multiplied by the other, the product of thē may bee 66 $\frac{2}{3}$, or little more, so that the more do not exceed the value of the greater terme as heere in this question the 2 neerest numbers are 12, and 6 $\frac{1}{11}$, which multiplied the one by the other, doe make 78, which is 11 $\frac{1}{3}$ more then is 66 $\frac{2}{3}$, wherefore that day when they should meete together, the first had gone but $\frac{2}{3}$ of a mile of his iourney, which was vppon the 12 day: then if you will know what part of the day that they did meete, you must diuide $\frac{2}{3}$ by 12, and you shall find $\frac{1}{18}$ of a day. Therefore in 11 daies and $\frac{1}{18}$ part of a day, that is vpon the 12 day, they shal meet together.

5 If a man doe owe vnto me 1000 Crownes, to be paid in 20 daies or terms, by Arithmeticall progreſſion: The queſtion is, to know with what number he ſhall begin and continue his progreſſion? Anſ. To do this you muſt ad 1 vnto 20, and they make 21, the which you ſhall multiplie by 10, which is the halfe number of the places, and thereof commeth 210, and thereſore diuide 1000, by 210, and thereof will come $4\frac{16}{21}$, the paiment of the firſt day, and by this number doth the ſaid Progreſſion encreaſe in this ſort following: $4\frac{16}{21}$ $9\frac{11}{21}$ $14\frac{6}{21}$ $19\frac{1}{21}$, &c. And ſo of all others.

A man oweth me 400 li. to be paid in 10 yeeres by progreſſion Arithmeticall, ẏ is to ſay, 40 li. at the end of the firſt yeere, and euery yeere following 40 li. to the end of 10 yeares: he offereth to pay me the ſaid 400 li. all at one paiment. The queſtion is to know, at what time hee ought to pay me the ſame at one paiment, that I be not intereſſed in the time? Anſw.

adde

adde 1 unto the number of the terms which are 10. & they make 11, whereof you muſt take the halfe, that is to ſay, $5\frac{1}{2}$: Therefore he muſt pay me at 5 yeare and $\frac{1}{2}$ the ſaid 400 li. all at one time: for that which he paieth before, is equal to ẏ which remaineth unpaied. This rule hath place only when ẏ paiments are equal. But if it happen, that the laſt paiment be leſſer than ẏ others you muſt in this caſe, put ẏ laſt paiment ouer one of the others, for to make therof a fraction: ẏ which muſt bee added unto the number of the termes, and the halfe of the ſaid ſum being taken, ſhall ſhewthe time ẏ the ſaid paimēt ought to bee paid at once. As if ẏ ſaid party did owe me but 380 pounds, to be paid euery yéere 40 li. it is certain ẏ he muſt haue 10. yéeres to end the paimēts. And it is true that upon the 10 day there would remaine but 20 li. to be paid. And therfore put 20 ouer 40 in this ſort, $\frac{20}{40}$ and that maketh $\frac{1}{2}$, the which you ſhal ad unto the number of termes, and you ſhall haue

$10\frac{1}{2}$,

10 $\frac{1}{2}$, whereof the halfe which is 5 $\frac{1}{4}$, doth shew that hee must pay the sayd 380 Li. at 5 yéeres $\frac{1}{4}$, all at one paymēt, and so of all such like.

Progression Geometricall is when the second nūber containeth the first in any proportion: as 2, 3, or 4 times, and so foorth. And in like proportion shal the third number containe the second, and the fourth number containe the third, and the fift, the fourth, &c. As 2,4,8, 16,32, 64: here the proportion is double. *Progreßion Geometricall.*

Likewise, 3, 9, 27, 81, and 243: are in triple proportion.

And 2, 8, 32, 128, and 512, are in proportion quadruple.

That is to say, in the first example, where the proportion is double, euery nūber contayneth ye other 2 times, as 4 containeth 2, two times: 8 contayneth 4, two times, &c. In the secōd example of triple proportion, the nūbers excéeds each other thrée times. And in the third exāple, the numbers excéed each other foure times, & thus

you

you see that Progression Arithmetical differeth from progression Geometricall, for that in Progression Arithmeticall the excesse is only in quantity, but in Progression Geometricall, the excesse is in proportion.

Now if you will easily find ẏ Sum of any such nūbers, you shall do thus, consider by what nūber they be multiplied, whether they bee multiplied by 2, 3, 4, 5, or by any other: and by the same number, you must multiply the last sum in the Progression. And from the product of the same multiplication, you shall abate the 1 number of that progression: & that which remaineth of the said multiplication, you shall divide by 1 lesse then was ẏ nūber by ẏ which you did multiply, & ẏ quotient shal shew you the sum of al ẏ numbers in any progression. As in this exāple, 5, 15, 45, 135, and 405: which are in triple proportion. Now multiplie 405, which is the last number, by 3: because they are in triple proportion, and they are 1215, from the

the which you shall abate the 1 nũber of the progression, which is 5 & there remaineth 1210: the which you shal diuide by a number lesse by 1 then ẏ was by the which you did multiply, that is to say by 2: & you shal find in ẏ quotient 605: which is the totall sum of the numbers of that Progression. Likewise 4, 16, 64, 256, and 1024, which are in proportion quadruple: therefore you shall multiply 1024, by 4, and thereof will come 4096, from the which abate the first number 4. and there will remaine 4092: The which you must diuide by 3, and you shall finde in your quotient 1364: which is the total summe of that progression, and this shall bee sufficient for Progression.

A Question of progression, Geometricall.

A Marchant hath sould 15. yardes of Satten, the first yard for 1 ß the second 2 ß. the third 4 ß. the fourth 8 ß. and so increasing by double progression Geometricall. The question

is

is to know how much the sayd Marchant shal receiue for the said 15 yards of Satten? Answ. First it is needfull to know, how much the whole numbers of the sayd progression do amount unto together. And for to doe it, you must find the last terme, therefore you must set downe the sayd Progression unto the 8 terme, which is 128: the which you shall multiply by it selfe, and thereof commeth the Fifteenth terme, that is to say, 16384: the same shall you multiply by 2, for because the Progression is double. And thereof will come 32768 from the which you must substract the first terme which is 1. And the rest being 32767, is the iust Summe of the 15 termes: and consequently the 15 yards of Satten shall be worth 32767 shillings, the which are 1638 li.

7 s.

The

Chap. 7.

Of the Rule of Three, called the *Golden rule: or the rule of foure Proportionals.*

The Rule of Thrée, is the chiefest most profitable, & the most excellent Rule of al the rules of Arithmeticke. For all other rules haue néed of it, and it passeth all other, for the which cause it is said, that the Philosophers did name it the Golden rule. And after others opinion and iudgement it is called the rule of proportiō of 4 numbers. But now in these latter daies, by vs it is called the rule of Thrée, because it requireth thrée nūbers in his operation. Of the which thrée nūbers, ẏ 2 first are set in a certaine proportion, & in such proportion as they be established, this rule serueth to find out vnto the 3 nūber, the 4 nūber to him proportioned, in such sort as the 2 is proportioned vnto the first. Not for that, that the foure nūbers, nor yet the thrée, are to bee proporti-

portionall, or set in one proportion, but such proportion, as is from the first to the second, ought to bee from the third vnto the fourth, that is to say, if the 2 number doe containe the 1 two times or more, so many times shall the fourth number containe the third. And note well that the first nũber & the third, in euery rule of three ought and must be alwaies of like denomination, and of one condition and nature. And the second number, and the 4, must likewise bee of one semblance and likenesse, and are dissemblant, and contrary to the other two numbers: that is to say, to the first, & the third. And if you do multiplie the first number by the fourth and the second number by the 3, the products of your two multiplications will bee equall. Likewise if you diuide the one semblant by the other, that is to say, the third number by the first, and likewise the one dissemblant, by the other that is to say, the 4 number by the second (which are dissemblant to the

other

other two numbers) your two quotients will also be equall.

The stile and manner of this rule, is thus: you must set down your three numbers in a certaine order, as by example following shall appeare. And then you shall multiplie the third nūber by the second, and the product or number that cometh of the same multiplication, you must diuide by ẏ first number: or otherwise diuide the first number by the second, & the quotient thereof shall bee your diuisor vnto the third number, that is to say, the third number shalbe diuided by the quotiēt of the foresaid diuision, that is by the quotient of the first nūber diuided by the second. Or otherwise, diuide by second number by the 1, and that nūber which cometh into your quotient you shall multiplie by the third number. And thus shall you haue ẏ fourth nūber which you seeke for. And thus is your fourth number in such proportion vnto the third, as your second number is vnto the first. Rule.

Example.

IF 8 bee worth 12, what are 14, worth, after the rate? or elſe if 8 require 12 for his proportionall, what will 14 demaund? The which three numbers may conueniently bee ſet in ſuch order as héerafter doth appeare.

If 8 make 12, what will 14 make? you muſt multiplie the third number 14, by the ſecond which is 12, and thereof commeth 168 for the whole product of this multiplication: the which (as the rule teacheth) you muſt diuide by the firſt number, that is to ſay by 8, and thereof cometh 21. And ſo much are the 14 worth. This is the way which is moſt vſed.

8.. 12.. 14..

	14
	12
	28
	14
168 | 21.	168
88 |	

Other

Otherwiſe diuide 8 by 12, which you cannot doe, for they are $\frac{8}{12}$, wherefore abbreuy $\frac{8}{12}$, and they are $\frac{2}{3}$ for your quotient, then diuide the third number 14, by the ſaid $\frac{2}{3}$, multiplying 14, by 3, which maketh 42: diuide 42 by 2, and you ſhall haue 21, as before. Or elſe diuide the ſecond number 12 by the firſt number 8, and thereof cometh 1 $\frac{1}{2}$, the which 1 $\frac{1}{2}$ you ſhall multiplie by the third number 14, and thereof will come 21, as is aboue ſaid; and thus muſt you doe of all other: and although, that the numbers of this rule may bee found in three differences, for ſometimes they are whole numbers and broken together, ſometimes broken number, and broken together, & ſome times all whole numbers: if they bee whole numbers, you muſt doe none otherwiſe, then you did in the laſt example. But in caſe they be broken numbers, or broken and whole numbers together, the manner and way to

$$\begin{array}{r} 2 \\ 4 \\ 8 \\ \hline 12 \\ 6 \\ 3 \end{array}$$

doe them, requireth a certaine variation and difficulty; according to the varietie of the numbers that shall bee proposed: the which operation easily to doe, and vnvariable, this rule teacheth.

The thrée numbers being set downe according vnto the order of the whole numbers aforesaid, without any broken nūber, let 1 bee put alwaies vnderneath euery whole number, with a line betwéen them fraction-wise, as thus $\frac{8}{1}$, and that 1 is denominator to euery such whole number. But when you haue whole number and broken together, they must bee reduced & added with their broken number, and if there be broken number without any whole number, the same broken must remaine in their estate.

The rule of Three in Fractions.

This being done, you shall multiplie the denominator of the first number, by the numerator of the second, and mul-

multiplie the product thereof againe by the numerator of the third number And so shall you haue the diuidend or number which must be diuided, then multiplie the numerator of the first number, by the denominator of the second, and multiplie againe the product therof, by ÿ denominator of the third number, and that which commeth of this multiplication, shal be your diuisor. Then diuide the number which is to be diuided by the diuisor, and you shall find the fourth number that you seeke. Of the which manner and fashions, of the rule of 3 are diuers kinds, whereof the first is of 3 whole numbers, as was the last example, & heere followeth the second.

If 15 pounds doe buy me 2 clothes, how many clothes will 300 Pounds buy me of the same price, that the 2 clothes did cost? set downe you three numbers thus.

The Example followeth in the next page.

Lib.	Clothes.	Lib.	
15	2	300.	2
		2	600
		600	155 (40
			1

And than as you see, you must multiply the 3 number which is 300 li. by 2, which is the second number, and thereof cometh 600, the which 600 you must diuide by the first number 15, and you shall finde in your quotient 40, which is 40 clothes, and so many clothes shall you buy for 300 li. as appeareth by practise heere aboue written. And heere you must marke ÿ the first number and the third in this question bee of one denomination, as before I haue declared, and likewise the 2 and the fourth numbers which you haue found, are of one semblance and likenesse, but in case that the first number and the third in any question be not of like denomination, you must (in working) bring them into one denomination, or nature, as in this example

ample following. If 12 Nobles doe gaine me 6 french crownes, how many French crownes will 48 Pounds gaine me? Here you see that the denomination of the first number, is Nobles, and the Denomination of the third is Pounds: wherefore, before you do proceed to worke by the rule of three, you must first turne the pounds into nobles, in multiplying 48 pound by 3, and they make 144 Nobles, for that there is in euery pound of Money 3 Nobles: or otherwise if you will, you may bring the first number being 12 Nobles, into Pounds by diuiding them by 3, and thus shall your first and third numbers be brought into one denomination: then shall you set downe your 3 numbers in order, thus.

If 12 nobles doe gaine me 6 french Crownes, what shall 144 Nobles gaine? the which 144 are the Nobles which are in 48 Li. Then multiplie the third number 144, by the second number 6, and thereof commeth 864,

the which you must diuide by 12 Nobles, and thereof cometh 72 French Crownes.

And so many French Crowns will the 144 Nobles gaine me.

Nobles.	Crownes.	Nobles.
12.	6.	144.

$$\begin{array}{r} 144 \\ 6 \\ \hline 864 \end{array} \qquad \begin{array}{r} \cancel{1}\cancel{2}0 \\ \cancel{8}\cancel{6}4 \\ \hline \cancel{1}\cancel{2}\cancel{2} \\ \cancel{1} \end{array} \qquad \begin{array}{l} \text{Nobles.} \\ (72 \end{array}$$

There is yet a more exact way wherby to worke in the rule of three, which is thus. You must marke if the third and first numbers in the rule of three, may both be diuided be one like diuisor: the which after you haue diuided thē, you shall write downe each of the quotients orderly in the said rule of 3, euery one of thē in his owne place, as though those were 2 of the numbers of your question, and not changing the middle number, that is

to

to say ẏ second. As thus if 50 crownes doe buy mee 44 yardes of cloth, how many Yardes shall I haue for 120 Crowns? Heere you may see that the third and the first numbers, may bee diuided by 10, which in the 3 number is found 12 times, and in the first 5 times. Wherefore you shall put 12 for the 3 number in the rule of three, instead of 120: and 5 for the first nũber in stead of 50, and let 44 remaine still in the midst, for the second number, after this sort as followeth, and then worke by the rule as before.

Crownes.	Yardes.	Crownes.	
5.	44.	12.	
	12.		
	88	3	
	44.	528	(105 3/5
	528	555	

You must multiplie 44 by 12, and thereof cometh 528: diuide the same 528 by 5, and you shall find in your quotient 105, 3/5, and euen so many yards

yardes should you haue found, if you had wrought the rule of three, by the first numbers proposed. There is yet certaine other varieties in working by the rule of thrée, but for that they require the knowledge of fractions, & because they are not so easie as this first way, which is common, therfore content your selues with this same, vntill you haue learned the fractions, ỳ which by Gods help I intend to set forth in the second part of this booke, incontinently after that I haue first taught you the backer rule of thrée.

Of the backer rule of Three.

The backer rule of thrée is so called, because it requireth a contrarie working to that, which the rule of three direct doth teach, whereof I haue now treated. For in the direct Rule of thrée, ỳ greater the third number is, so much the greater will the fourth be But héere in this backer rule it is contrariwise, for the greater the 3 number

ber is, so much lesser will the fourth be. Then, whereas in the rule of thrée direct, the third number is multiplied by the second, and the product thereof diuided by the first: heere you must multiplie the second number by the first, and diuide the product of ẏ same by the third, and the number which commeth in the quotient, answereth to the question, For such practise cõmeth often times in vse: In such sort that if you should worke the same by the rule of thrée direct, and not to haue a regard vnto the Proportion of the question, you should then commit an euident and open error.

Example.

If 15 shillings worth of Wine, will serue for the ordinary of 46 men when the Tunne of Wine is worth 12 pounds: for how many men will the same 15 shillings worth of Wine suffice, when the Tunne of Wine is worth but 8 Pounds? It is cer-

taine

taine, that the lower the price is, that the Tunne of Wine doth cost, so many more persons will the said 15 shillings in wine suffice. Therefore set downe your numbers thus: if 12 pounds suffice 46 Men, how many men will 8 pounds suffice? you must multiplie 46 by 12, and thereof commeth 552, the which you shall diuide by 8, and thereof commeth 69, & vnto 69 Men, will the said 15 Shillings worth in wine suffice, when the Tun of Wine is worth but 8 Pounds, as heereafter doth appeare by practise.

Lib.	Men.	Lib.		
12.	46.	8.		
	12.		7	
	92.		552	(69.
	46.		88	
	552.			

2. Likewise a messenger maketh a iourney in 24 daies, when the day is but 12 houres long: in how many

daies

daies ſhall he make the ſame iourney, when the day is 16 houres in length? Héere you may perceiue, that the more houres there are in a Day, the fewer daies the meſſenger will bée in going his iourney. Therefore write downe your numbers thus, as héere you may ſée.

Howers.	*Dayes.*	*Howers.*	
12.	24.	16.	4
	12.		~~12~~
	48.		~~288~~
	24.		~~166~~(18
	288.		~~1~~

And then multiplie 24 daies by 12 houres, and thereof cometh 288: diuide the ſame 288, by the third number 16, & you ſhall find 18, the which is 18 daies, and in ſo many daies will the meſſenger make his iourney, when the day is 16 houres long.

Likewiſe, when the Buſhell of wheat doth coſt 3 ſhillings, the penny loafe of Bread weigheth 4 lib.

I

I demaund what the ſame pennie loſe ſhall weigh, when the buſhell of wheate is worth but 2 ſhilling? Heere is to bee conſidered, that the better cheape the wheate is, the heauier ſhal the penny loafe weigh, and therfore write downe your 3 numbers thus.

Shil.	*Lib.*	*Shil.*		
3.	4.	2.		
	3.		x z	*Lib.*
	12.		z	(6.

Then multiply 4 lib. which is the ſecond nūber, by the firſt number 3, & they make 12, the which 12 you ſhall diuide by the third number 2 & thereof cometh 6 li. & ſo much muſt the penny loafe of bread weigh, when the buſhell of wheat is worth but 2 ß. as may appeare. And now according to my former promiſe, ſhall follow the ſecond part of Arithmeticke, which teacheth the working by Fractions.

Here endeth the firſt part of
Arithmeticke.

The second part of Arithmeticke *which treateth of Fractions or* broken Numbers.

Chap. 1.

Of Fractions or broken numbers, & *the difference thereof.*

A Fraction or a broken number, is as much as a part, or many partes of 1, whereof there are two numbers with a line betweene them both, that is to say, the one which is aboue the line, is called the numerator, the other vnderneath the line, is called the denominator, as by examp. 3 quarters is called a fraction, which must be set downe thus, $\frac{3}{4}$, whereof 3 which is the higher number aboue the line is called the numerator, & 4 which is vnder the line, is called the denominator. And it is alwaies conuenient that the numerator bee lesse in number than the denominator

 minator

minator. For if the numerator, and the denominator be equall numbers, thē shall they represent a whole number thus as $\frac{1}{1}, \frac{2}{2}, \frac{3}{3}$, which are whole numbers: by reason that the numerators of these, and all such likes, may be diuided by their denominators, & the quotients will alwaies be but 1. But incase that the numerator of any fraction do exceed his denominator, then it is more then one whole: as $\frac{29}{18}$, is more than a whole nūber by $\frac{11}{18}$. And this is properly called an improper fraction: other definition doth not heereunto appertaine. Furthermore it is to be understood, that when the numerator is iust the halfe of the denominator, then the same broken nūber is the iust halfe of one whole, as $\frac{6}{12}, \frac{7}{14}, \frac{8}{16}, \frac{9}{18}$, and the other like are the halfes of one whole number whether it be of money, of measure, of weight, or any other thing: whereof doth grow and come forth 2 progressions naturall: the one progreding by augmenting or increasing, as these.

$\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}, \frac{7}{8}, \frac{8}{9}, \frac{9}{10}$. &c.

And they doe procéed infinitely and will neuer reach to make a whole number, thus $\frac{1}{1}$. And the other progression, doth progredie by diminishing or decreasing as thus.

$\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{7}$, $\frac{1}{8}$, $\frac{1}{9}$, $\frac{1}{10}$. &c.

And these doe procéed infinitely, & shall neuer come to make a o. which signifieth nothing, but shall euer retaine some certaine value of an vnity wherby it doth appeare that fractions or broken numbers are infinite.

Chap. 2.

Of the reducing or bringing together of 2 Fractions, or many of diuers denominations, *vnto fractions of one like denomination.*

REduction, is as much as to reduce & bring together, or to put 2 or many numbers, being of diuers denominations the one from the other, into Fractions of one denomination,

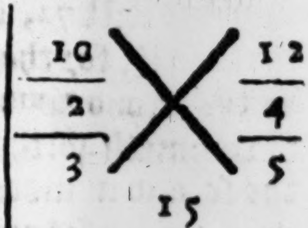
in reducing them vnto a common denominator, and the reason héereof is, For because the diuersitie and difference of the broken numbers do come of the denominators part, or of diuers denominators, and for the vnderstanding héerof, there is a generall rule whose operation or working is thus. Multiply the denominators of the fractions, the one by the other, and so you shall haue a new denominator cōmon to all the fractions, the which denominator you must diuide by the particular denominators of euery of the said fractions, and multiply euery quotient by his owne numerator, and so you shall haue new Numerators, for the numbers which you would reduce, as appeareth by this example following.

Reduction in common denomination.

Reduction. 1.

1 If you will reduce $\frac{2}{3}$ and $\frac{4}{5}$ together, first make a crosse betweene the 2 fractions as héere you sée, & then you

you muſt multiply the two denomi-
nators the one by the other, as thus,
3 by 5 maketh 15, which is your com-
mon denominator, ſet that under the croſſe, then diuide 15 by the denominator 3, and you ſhall haue 5, which



multiplie by the numerator 2, & you
ſhall find 10, ſet that ouer the $\frac{2}{3}$ and
they are $\frac{10}{15}$, for the $\frac{2}{3}$. Afterwards di-
uide 15 by the denominator 5, and
thereof commeth 3, the which multi-
plie by the numerator 4, and you ſhall
finde 12, which ſet ouer the head of
the $\frac{4}{5}$ and they make $\frac{12}{15}$ for the $\frac{4}{5}$: as
appeareth more plainer aboue in the
margent.

2. If you will reduce $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{8}$, toge-
ther, you muſt multiply all the deno- *Redu-*
minators the one by the other, that is *ction.* 2.
to ſay, 2 by 3 maketh 6: then 6 by 4
amounteth to 24. Laſt of all 24 by 6,
and thereof commeth 144, for the cō-
mon denominator. Then, for the firſt

ction which is $\frac{1}{2}$ diuide 144 by the denominator 2, and thereof commeth 72 the which multiply by the numerator 1, & it is still 72, set that ouer the $\frac{1}{2}$ & that is $\frac{72}{144}$, for the $\frac{1}{2}$: Then diuide 144 by the second denominator 3, & thereof commeth 48: the which multiply by the second numerator 2, and they are 96, which set ouer the $\frac{2}{3}$, and they make $\frac{96}{144}$, for the $\frac{2}{3}$: Then diuide 144 by the third denominator 4, and thereof commeth 36, the which multiplie by the third numerator 3, and they make 108, which set ouer the $\frac{3}{4}$, and they are $\frac{108}{144}$ for the $\frac{3}{4}$.

Finally diuide 144 by the last denominator 6, and thereof cometh 24: The which multiply by the last numerator 5, and thereof commeth 120, which set ouer the $\frac{5}{6}$, and they are $\frac{120}{144}$; for the $\frac{5}{6}$ as appeareth here by practise.

The Example followeth in the next page.

72|36|108|120

$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$,

144

2	x44 (72	x	x
3	22 1	x44 (48	
6	72	33 2	
4		96	
24	x	x	
6	x44 (36	x44 (24	
144	44 3	66 5	
	108	120	

Reduction, of broken numbers of broken.

IF you will reduce ẏ broken of broken together, as thus, the $\frac{2}{3}$ of $\frac{1}{4}$. of $\frac{4}{5}$, you must multiply all the numerators, the one by the other to make one broken number of the thre broken nūbers: that is to say, 2 by 1, maketh 2: and then 2 by 4, maketh 8, which 8 is your numerator. Then multiply the Denominators the one by the other, that is to say, 3 by 4, maketh 12, and thrn 12 by 5, maketh 60, for your deno- *Reduction. 3.*

8

2, 1, 4,

3 4 5

60.

minator, set 8 ouer 60, with a line betweene them, and they bee $\frac{8}{60}$ which being abbreuied are $\frac{2}{15}$, and so much are the $\frac{2}{3}$, of $\frac{1}{4}$, of $\frac{4}{5}$ as appeareth in the margent.

Another example of the same Reduction, and of the second *Reduction*.

Reduction. 4. If you will reduce $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, the $\frac{3}{4}$ of $\frac{1}{7}$: And the $\frac{1}{3}$, of the $\frac{1}{2}$, of ÿ $\frac{5}{6}$ $\frac{2}{3}$ of $\frac{1}{3}$. First it behoueth you of euery party of the broken numbers, to make of each of them one broken: as by the third Reduction is taught: that is to say, in multiplying the numerators by numerators, and denominators by denominators: First for the first part which is $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, you must as is before said, multiplie 2 by 1, and then by 4, and you shall haue 8 for the numerator: likewise multiplie 3 by 4, & the product by 5, and you shall haue 60 for the denominator: so they make $\frac{8}{60}$ which being abbreuied are $\frac{2}{15}$, for the first

first part, that is to say, for the $\frac{2}{3}$ of $\frac{1}{4}$ of $\frac{4}{5}$: secondly for the $\frac{3}{4}$ of $\frac{5}{7}$ multiplie likewise the numerator 3 by 5, maketh 15, for the numerator. And multiplie 4 by 7, maketh 28, for the denominator. And then they be $\frac{15}{28}$ for the second part: that is to say, for the $\frac{3}{4}$ of $\frac{5}{7}$. Thirdly for the $\frac{1}{2}$ of $\frac{1}{2}$, of $\frac{2}{3}$, of $\frac{1}{3}$ you must multiplie the numerators the one by the other, that is to say, 1 by 1, and then by 2, and last by 1, & all maketh but 2 for ye numerator: likewise multiplie the denominators 2 by 2 maketh 4, and 4 by 3 maketh 12, & then 12 by 3 maketh 36, for the denominator: and they are $\frac{2}{36}$. which being abbreuied maketh $\frac{1}{18}$ for the third part, that is to say, for $\frac{1}{2}$ of the $\frac{1}{2}$, of $\frac{2}{3}$, of $\frac{1}{3}$. Last of all take the $\frac{2}{15}$, the $\frac{15}{28}$, and the $\frac{1}{18}$, and reduce them according to the order of the second reduction, and you shall find $\frac{1008}{7560}$ for the $\frac{2}{15}$. And $\frac{4050}{7560}$ for the $\frac{15}{28}$. And $\frac{420}{7560}$ for the $\frac{1}{18}$: and thus are broken numbers of broken reduced, as appeareth by practise.

$$\frac{8}{\frac{2}{3},\ \frac{2}{4},\ \frac{4}{5},}\ \ 60$$

2 | 1 | $\frac{1}{2}$ | $\frac{4}{8}$

3 | 4 | $\frac{1}{2}$ | 5 | 60

2 | 8 | 60 | 15

15 | $\frac{3}{5}$ | 4, 7, 9 | 28

$$\frac{2}{\frac{1}{2},\ \frac{1}{2},\ \frac{2}{3},\ \frac{1}{3}\ 9}\ \ 36$$

1 | $\frac{1}{2}$ | $\frac{2}{3}$ | $\frac{1}{2}$

2 | $\frac{2}{4}$ | $1\frac{3}{2}$ | $\frac{1}{3}\frac{3}{6}$

9 | 2 | $\frac{1}{2}$ | 18

1008	4050	420
$\frac{2}{15},$	$\frac{15}{28},$	$\frac{1}{18}$
	7560	

15	~~202~~		~~15~~	
28	~~7560~~	(504	~~380~~	
120	~~1555~~	2	~~7560~~	(270
30	~~11~~	1008	~~2888~~	15
420			~~22~~	1350
18				270
3360				4050
420	~~1~~			
7560	~~330~~			
	~~7560~~	(420		
	~~2888~~	1		
	~~22~~	420		

Reduction of broken numbers, and the parts of broken together.

If you will reduce $\frac{1}{3}$, and the $\frac{1}{2}$ of $\frac{1}{3}$, together, to bring them into one broken Number, you must first set *Reduction. 5.* downe the $\frac{1}{3}$ and $\frac{1}{2}$ as appeareth in the margent with a crosse betwéene them, & then multiply yͤ two denominators, the one by the other, that is to say, 2 by 3 maketh 6,

set that vnder the crosse, then multiply the first numerator 1, by the last denominator 2, & that maketh 2 vnto yͤ which ad the last denominator 1, & they be 3, which set aboue the crosse, so you shal find yͭ $\frac{1}{3}$ & the $\frac{1}{2}$ of $\frac{1}{3}$, do make $\frac{3}{6}$ which béeing abbreuied doth make $\frac{1}{2}$, which is as much as the $\frac{1}{3}$ and the $\frac{1}{2}$, of $\frac{1}{3}$, being reduced into one fraction. Likewise if you will reduce the $\frac{2}{3}$ and the $\frac{1}{4}$ of $\frac{1}{3}$, you must doe as before, set downe the $\frac{2}{3}$ and $\frac{1}{4}$, with a crosse

betwéene

betwéen them, then multiplie the two denominators the one by the other, yͭ is to say 3, by 4 maketh 12: which set vnder the crosse, as you sée in the margent: and then multiply the first numerator 2, by the last denominator 4, and thereof commeth 8, whereunto adde the last numerator 1, and that maketh 9, which 9 set ouer the crosse: so shall you find that the $\frac{2}{3}$ and the $\frac{1}{4}$, of $\frac{1}{3}$, are worth $\frac{9}{12}$, the which abbreuied doe make $\frac{3}{4}$ as appeareth by example in the margent.

$$\begin{array}{ccc|c} & 9 & & 3 \\ \frac{2}{3} & \times & \frac{1}{4} & \frac{9}{12} \\ & 12 & & 4 \end{array}$$

***

Reduction of whole Numbers and broken together in a Fraction, *the which fraction is called an improper fraction.*

If you will reduce whole Number and broken into broken, you shall reduce the whole number into broken as by this example may appeare: if you wil reduce 17 $\frac{5}{8}$ into a broken nũber, first you must multiply the whole number 17 by the denominator of the broken, which is 8, in saying 8 times 17, doe make 136, vnto the which you must adde the numerator of $\frac{5}{8}$ which is 5, and all amounteth to 141, which set ouer 8, with a line betwéene them, and they will bee $\frac{141}{8}$ so much is 17 $\frac{5}{8}$ worth in an improper fraction, as appeareth here by practise. *Reduction. 6.*

17	141	
8	17 $\frac{5}{8}$	
136		maketh $\frac{141}{8}$
5		
141		

In

In case you haue whole number & broken, to be reduced with broken, you must bring the whole number into his broken, in multiplying it by the denominator of the broken number going therewith, and adde thereunto the numerator of the said broken number, as in the last example is declared, and then reduce that broken number with the other broken, as héere appeareth by this example. Reduce $10\frac{2}{3}$ and $\frac{4}{7}$, together, first bring $10\frac{2}{3}$ all into thirds, as it is taught by the Sixt Reduction, and you shall find $\frac{32}{3}$, then reduce the $\frac{32}{3}$ and $\frac{4}{7}$ together, by the first reduction, and you shall find $\frac{224}{21}$ for the $\frac{32}{3}$: and $\frac{12}{21}$ for $\frac{4}{7}$ as appeareth héere by practise.

$$\frac{32}{10\frac{2}{3}} \;\Big|\; \frac{224}{\frac{32}{3}} \quad \times \quad \frac{12.}{\frac{4}{7}}$$

21

32. 4.

7. 3.

224 12

Also in case you haue in both parts of

of your reduction, as well whole nū-ber as broken, you must alwaies put the whole of each part into his broken as by the 6 Reduction is taught.

Example.

If you will reduce 12 $\frac{2}{4}$ with 14 $\frac{2}{3}$, to bring them into one denomination first bring the 12 $\frac{1}{4}$ all into fourths, & you shall find $\frac{49}{4}$: then likewise reduce 14 $\frac{2}{3}$, all into thirds, and you shall have $\frac{44}{3}$, for the 14 $\frac{2}{3}$: then reduce $\frac{49}{4}$, and $\frac{44}{3}$, together, by the order of the first reduction, and you shall find $\frac{147}{12}$, for the $\frac{49}{4}$. And $\frac{176}{12}$ for the $\frac{44}{3}$: as here by practise doth plainely appeare.

$$\frac{49}{12\frac{1}{4}} \left| \frac{44}{14\frac{2}{3}} \right| \frac{147}{\frac{49}{4}} \quad \times \quad \frac{176}{\frac{44}{3}}$$

$$12$$

The

Chap. 3.

Of abbreuiation of one broken number into a lesser broken.

ABbreuiation is as much as to set downe, or to write a broken nũber by figures of lesse signification, and not diminishing the value thereof. The which to doe, there is a rule whose operation is thus, diuide the numerator, & likewise the denominator, by one whole number, the greatest that you may find in ẏ same broken number, & of the quotient of that numerator, make it the numerator, and likewise of that of the denominator, make it your denominator, as by example.

1. If you will abbreuiate $\frac{54}{81}$, you shal understand that ẏ greatest whole number that you may take, by the which you may diuide the numerator and the denominator is 27, which is the halfe of the denominator, & that is a whole number, for you cannot take

take a whole number out of the deno- minator 81, which will diuide both the numerator and denominator, but that there will be either more or lesse than a whole number, therfore if you diuide 54 by 27, you shall find in the quotient 2 for the numerator, likewise if you diuide 81 by 27, you shall haue in the quotient 3, for the denominator: then put 2 ouer the 3, with a line betweene them, and you shall finde $\frac{2}{3}$, and thus by this rule the $\frac{54}{81}$ are abbreuied vnto $\frac{2}{3}$: as appeareth in the margent, and so is to bee vnderstanded of all other.

$$\frac{54}{81}$$

~~1~~ ~~0~~
~~5~~ ~~4~~ (2
~~2~~ ~~7~~

$$\frac{2}{3}$$

~~2~~ ~~0~~
~~8~~ ~~1~~ (3
~~2~~ ~~7~~

The forme and manner how to find the greater number, by the which you may wholy diuide the numerator *and denominator, (to the end ye may abbreuiate them) is thus.*

First diuide the denominator by his numerator, & if any number do remaine, let your diuisor be diuided by the same number, and so you must cõtinue vntill you haue so oftentimes diuided, that there may nothing remain, then it is to be vnderstood, that your last diuisor (whereat you did end and that 0 did remaine after your last diuision) is the greatest number, by ÿ which you must abreuiate, as you did in the last examp. But in case ÿ your last diuisor be 1, it is a token that the same number cannot be abreuied to any lower fractiõ than you find it at the first. Exam. of $\frac{54}{81}$: diuide 81, which is the denominator by 54, which is his numerator, and there resteth 27, then diuide 54 by 27, and there remayneth a 0, which is nothing, wherefore your last

last diuisor 72 is the number by the which you must abbreuiate $\frac{54}{81}$: as in the last example is specified.

Another manner of Abbreuation.

1 Mediate the numerator and also the denominator of your Fraction in case the numbers bee euen, that is to say, take alwayes of the halfe of the numerator & likewise of the denominator, and of the mediation or halfe of ŷ numerator, make it your numerator, also of half the denominator make your denominator, & so continue as often as you can in taking alwayes the halfe of your numerator, & likewise of the denominator: or else see if you may abreuiate the numbers which doe remayne, by 3, by 4, by 5, 6, 7, 8, 9, or by 10: for you must abreuiate them as often as you can by any of the sayd numbers. And it is to be noted, that with whatsoeuer number of these, you doe abreuiate the numerator of your fraction, by the same you must abre-

uiate likewise the denominator, so continuing untill they can no more be abbreuied. And it is to be understood, that if the numerator and the denominator be euen nūbers, as you may know when the first figure is an euen number, or a 0, then you may perceiue if both the numerator and the denominator may be abbreuied by 10, by 8, by 4, or by 2: albeit that sometimes they may bee abbreuied by 3. And if they be odde numbers, then must you consider if they may be abbreuied by 9 by 7, by 5, or by 3: but when the first number, as well of the numerator, as of the denominator are euen numbers then may you wel know that such nūbers may be abbreuied by 2, as is aforesaid, and if you ad the figures of the numerator together, in such manner as you doe in making the proofe by 9 in whole numbers: that is, if you find 9, it appeareth that you may abbreuie that number by 9. And likewise by 3, and sometime by 6, if you find 6 it may bee abbreuied by 6, and

alwaies

alwaies by 3 if you finde 3, it is a signe that you abbreuiate by 3, & by whatsoeuer nūber that you doe abbreuiate the numerator, the same must you abbreuiate likewise the denominator: and if the first figures of the same nūber be 5, or 0 you may abbreuiate thē by 5, but if the first figures be both 0, they may bee abbreuied by 10, *in* cutting away the two Ciphers thus, as $\frac{2}{3}|\frac{0}{0}$ which maketh $\frac{2}{3}$, and sometimes by 100, thus, as $\frac{1}{2}|\frac{00}{00}$, in cutting away the foure ciphers after this sort, $\frac{1}{2}|\frac{00}{00}$ and then the $\frac{1}{2}|\frac{00}{00}$ doe make $\frac{1}{2}$, and after this maner haue I set héere diuers examples: although that all broken numbers cannot bee abbreuied by this rule, yet all fractions may be well abbreuied by the first rule aforesaid.

Abbreuied.

$\frac{3840}{7680}$	by	10.	$\frac{1890}{4725}$	by	9.
$\frac{384}{768}$	by	8.	$\frac{210}{525}$	by	7.
$\frac{48}{96}$	by	9.	$\frac{30}{75}$	by	5.
$\frac{8}{16}$	by	4.	$\frac{6}{15}$	by	3.
$\frac{2}{4}$	by	2.	$\frac{2}{5}$		
$\frac{1}{2}$					

3 Furthermore, you shall vnderstand that sometimes it happeneth, that all the Figures of the numerator are equall vnto them of the denominator, which when it so happeneth, you may then take one of them of the numerator, & also one of them of the denominator, and it shall be abreuied as $\frac{555}{888}$, being abreuied after this manner cometh to $\frac{5}{8}$. And yet it hapeneth sometimes, that 2 or many figures of the numerator are proportioned vnto 2, or many figures of their denominators, and that the other figures of the same number are the figures one to the other as this proportion following

ing. This may you take two or more figures, aswell of the numerator, as of the denominator, & by this manner the same number shall be abbreuied, as $\frac{4747}{5929}$ being abreuied by this rule, doe come to $\frac{47}{59}$.

4 Also it happeneth sometimes, that you would abreuiate one number vnto the semblance or likenesse of an other: And for to know if the same may bee abbrenied, and also by what number it may be abreuied, you must diuide the numerator of the one number, by the numerator of the other: & likewise the denominator of the one, by the denominator of the other, for in case that after euery diuision there do remaine 0 and that the two quotients be equal, then is one of them the number by the which the said fraction must be abreuied, as by example, of $\frac{115}{207}$. I would know if they may bee abreuied vnto $\frac{5}{9}$, and for to doe this, you must diuide 115 by 5, and you must diuide 207 by 9, and there will

come into both the quotients 23: by the which it appeareth that this number may be abbreuied by 23.

	1 0		
$\frac{115}{207}$	1 1 5		2 0
$\frac{5}{9}$	5 5	(23	2 0 7
			9 9 (23

Chap. 4.

Of the adding of two or many brokē numbers together, as by example.

For to adde Fractions or broken numbers together there is a generall Rule, which is thus. If the nūbers be of vnlike denominations the one to the other, you must reduce thē into a common denomination by the doctrine of the first reduction: & when you haue reduced them, you must then adde both the numerators together, and set the product of the same addition ouer the crosse, and diuide the same Numerator by the common denominator

nator, as by this example following.

1 If you will adde $\frac{2}{3}$ with $\frac{3}{4}$. you muſt firſt reduce the two Fractions both into one denomination, according to the order of the firſt reduction, that is to ſay, in multiplying the denominator of the firſt fraction which is 3 by the denominator of the other fraction which is 4, and they make 12 for your common denominator: the which 12 you ſhal ſet vnder yͤ croſſe then multiply the firſt numerator 2 by the laſt denominator 4: ⁊ thereof cometh 8, which ſet ouer the $\frac{2}{3}$, and

5
x2
x7 (1 $\frac{5}{12}$

then multiplie the laſt numerator 3, by the firſt denominator 3, and thereof cometh 9, which you muſt ſet ouer the $\frac{3}{4}$: then ad the numerator 8, with the numerator 9, and they make 17, which ſet ouer the croſſe, ⁊ then your

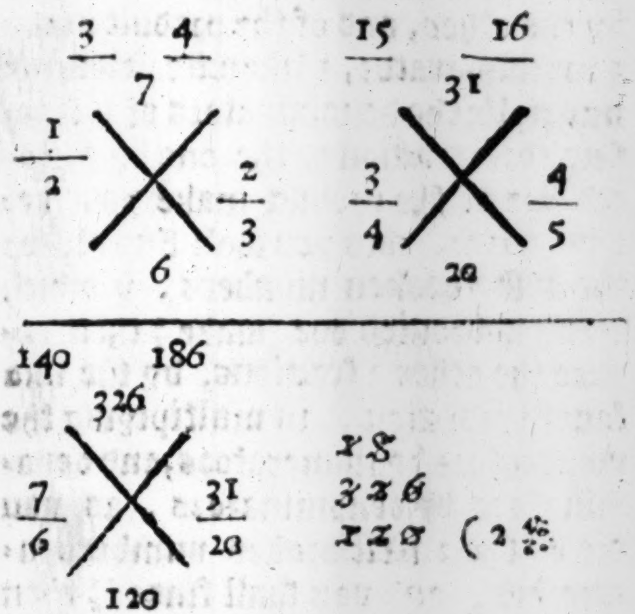
fraction

fraction will be $\frac{17}{12}$ which is the additi-on of the $\frac{2}{3}$ with $\frac{3}{4}$. And because the numerator 17, is greater than his denominator 12, therefore you must divide 17 by 12, and thereof will come 1 and 5 remaining, which 5 you must set apart, and 12 under the same with a line betweene them, and they are worth $\frac{5}{12}$, and so much are the $\frac{2}{3}$ added with $\frac{3}{4}$, as doth appeare.

Addition in broken Numbers.

2. Also if you will ad $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$ together you must first ad the $\frac{1}{2}$ and $\frac{2}{3}$ together, according to the doctrine of the last rule, and you shall find $\frac{7}{6}$: then ad $\frac{3}{4}$ & $\frac{4}{5}$ together by the said last rule, and they make $\frac{31}{20}$. Then finally adde the $\frac{7}{6}$ (which came of the $\frac{1}{2}$ and $\frac{2}{3}$ added together) with $\frac{31}{20}$, which came of the $\frac{3}{4}$ and $\frac{4}{5}$ added together, and you shall finde by the aforesaid Addition that they amount unto $\frac{326}{120}$. Wherefore divide 326 by 120, and thereof commeth 2 and 86 remaineth which is $\frac{86}{120}$ of one

one whole, and they being abreuied doe make $\frac{43}{80}$, and thus the $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{2}{5}$ being added together doe amount to 2 and $\frac{43}{80}$, as heere vnder doth appeare.



Addition of broken number of broken.

3. Furthermore, if you will ad the broken numbers of broken together as

as to ad the $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}$, with the $\frac{5}{6}$ of $\frac{1}{2}$ of $\frac{5}{8}$: first you must reduce the nūbers according to the order of the Fourth Reduction, in multiplying the numerators of the first 3 fractions, the one by the other, and of the product make your numerator, & likewise you must multiplie the denominators of ẏ foresaid thrée fractions, the one by the other, & of the product make your denominator, and you shall find $\frac{24}{60}$, for the first 3 broken numbers, ẏ which being abbreuied doe make $\frac{2}{5}$ then reduce the other 3 fractions, by the said fourth reduction, in multiplying the numerators by numerators, and denominators by denominators, as you did by the 3 first broken numbers aforesaid, and you shall finde $\frac{25}{96}$ then must you ad the $\frac{2}{5}$ which came of the first 3 broken numbers, and $\frac{25}{96}$ which are come of the last 3 fractions, both together, by the instruction of the first addition: & you shall find $\frac{317}{480}$: which cannot bée abbreuied, but is the iust product of the addition: so much are $\frac{2}{3}$

of

of $\frac{3}{4}$ of $\frac{4}{5}$ added with the $\frac{5}{8}$ of $\frac{1}{2}$ of $\frac{5}{6}$ as hæreafter by practise doth euidentlie appeare.

$$\frac{24}{\frac{2}{3},\ \frac{3}{4},\ \frac{4}{5},}\ \ 60 \qquad \frac{2}{5} \qquad \frac{25}{\frac{5}{8},\ \frac{1}{2},\ \frac{5}{6},}\ \ 96$$

$$317$$

$$192 \qquad 125$$

$$\frac{2}{5} \qquad \frac{25}{96} \qquad \frac{317}{480}$$

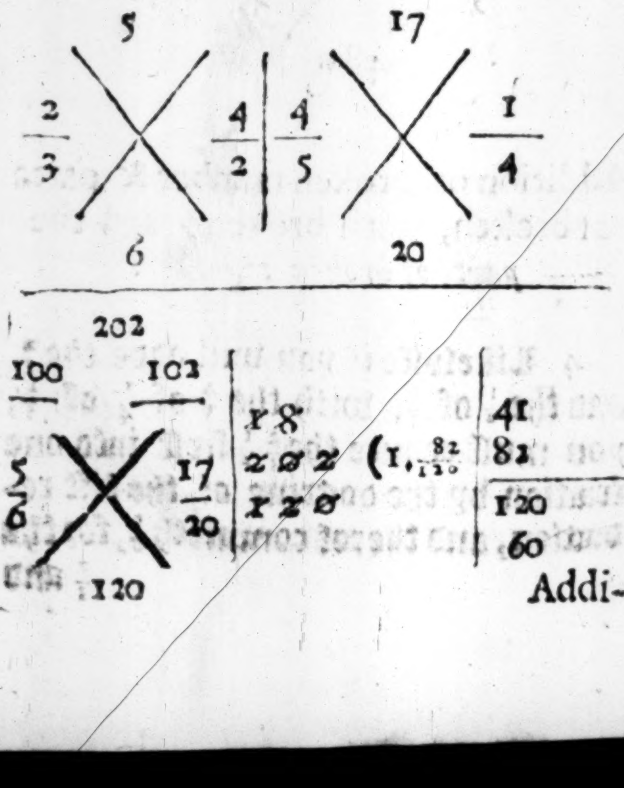
$$480$$

Addition of broken number & parts of broken, with broken, and the *parts of broken together.*

4 Likewise if you will adde the $\frac{2}{3}$, and the $\frac{1}{2}$ of $\frac{1}{3}$, with the $\frac{4}{5}$ of $\frac{1}{4}$ of $\frac{1}{5}$, you must reduce the $\frac{2}{3}$ $\frac{1}{2}$ first into one fraction by the doctrine of the fift reduction, and therof commeth $\frac{5}{6}$, for the $\frac{2}{3}$ and

$\frac{2}{3}$ and $\frac{1}{2}$ of one of the sayd thirds: then reduce the $\frac{4}{5}$ and $\frac{1}{4}$ by the said fift reduction, and thereof commeth $\frac{17}{20}$.

Last of all adde the $\frac{5}{6}$ and $\frac{17}{20}$ together according to the first rule of addition, and you shall find $\frac{202}{120}$, which being diuided bringeth 1, and $\frac{82}{120}$ part remaining, which abreuied maketh $\frac{41}{60}$, and thus you doe perceiue that the $\frac{1}{3}$ and $\frac{1}{2}$ of $\frac{1}{3}$ added with the $\frac{4}{5}$ and $\frac{1}{4}$ of $\frac{1}{5}$ doe amount unto 1 $\frac{41}{60}$, as hereafter by practise doth plainely appeare.



Addition of whole number & broken with whole number and broken.

5. Also if you will adde $12\frac{4}{5}$ with $20\frac{5}{6}$ you may, (if you will) adde 12 and 20 together, and they make 32, the which you shall set apart, & then adde the two broken Numbers together, that is to say $\frac{4}{5}$ and $\frac{5}{6}$, by the order of the first addition, & they make $\frac{49}{30}$ therefore diuide 49 by 30, and thereof commeth 1 and $\frac{19}{30}$ parts remaine, which 1 you must adde vnto the 32, which were put apart, and the whole addition will be $33\frac{19}{30}$. Or otherwise, you may reduce $12\frac{4}{5}$ into the likenesse of a Fraction by the order of the Sixt reduction, & they will be $\frac{64}{5}$ and likewise by the same reduction, reduce $20\frac{5}{6}$ and they bee $\frac{125}{6}$, then adde $\frac{64}{5}$ with the $\frac{125}{6}$, by the first addition, and you shall find $\frac{1009}{30}$. Therefore diuide 1009 by 30, and thereof commeth $33\frac{19}{30}$ as before, and as by practise of the same both wayes doth heereafter appeare.

49

$12\frac{4}{5}$ | $\frac{24}{\frac{4}{5}}$ | $\frac{25}{\frac{5}{6}}$ | 1
$20\frac{5}{6}$ | | | 49 ($1\frac{19}{30}$
1 | | | 30
$33\frac{19}{30}$

30

1009

$\frac{64}{12\frac{4}{5}}$ | $\frac{125}{20\frac{5}{6}}$ | $\frac{384}{64}$ 5 | $\frac{625}{125}$ 6

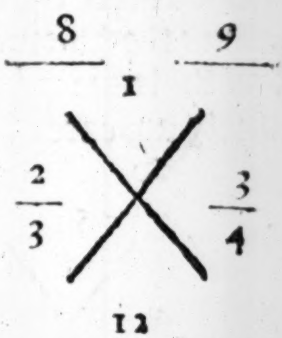
30

11
1009 ($33\frac{19}{30}$
330

Chap. 5.
Of Subſtraction in broken Numbers.

1 IF you will ſubſtract $\frac{2}{3}$ from $\frac{3}{4}$, you muſt firſt reduce both the fractions into a common denomination, by the doctrine of the firſt reduction, and you

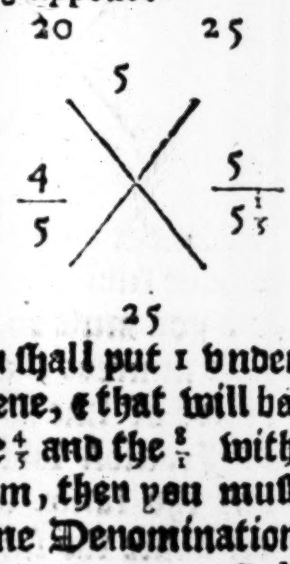
you ſhall finde $\frac{8}{12}$ for the $\frac{2}{3}$, and $\frac{9}{12}$ for the $\frac{3}{4}$. Therefore abate the numerator 8 from the numerator 9, & there will remaine 1, which 1 you muſt ſet ouer the croſſe, & the ſame is, $\frac{1}{12}$, & ſo much is the reſt of that ſubſtraction, as may appeare héere by practiſe.



2 But if you haue a broken number to be ſubſtracted from a whol nūber, you muſt borrow 1 vnitie of the whole number, and reſolue it into a fraction of like Denomination, as is that Fraction which you would abate from the ſame whole number, and then abate the ſaid fraction therfrom, and you ſhal find what doth remaine, as by this example. If you abate $\frac{4}{5}$ frō

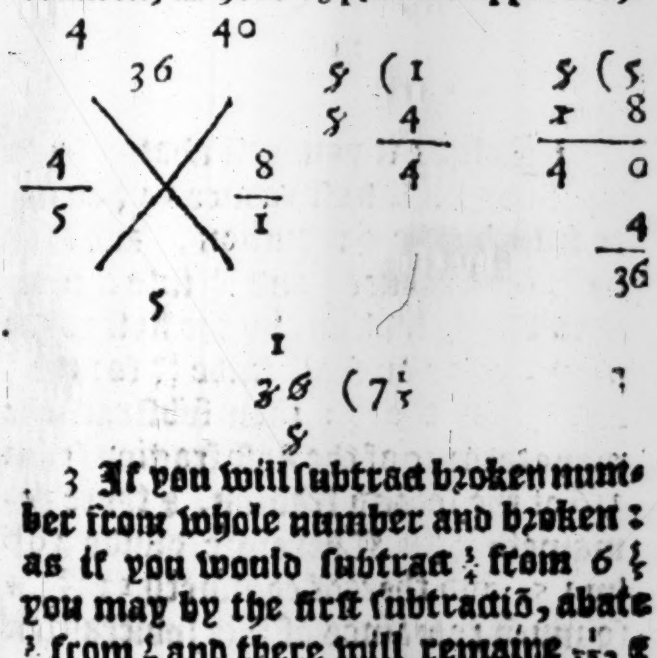
8, you must borrow one of the said 8, and resolue it into fifts like vnto the fraction, because it is $\frac{4}{5}$, & that 1 will be 5 fifts thus $\frac{5}{5}$ therfore abate $\frac{4}{5}$ from $\frac{5}{5}$ and there will remaine $\frac{1}{5}$, and substract the 1 which you borrowed from 8, and there doth remaine 7: and the $\frac{1}{5}$ also which remained after the said $\frac{4}{5}$ were abated. Thus the $\frac{4}{5}$ beeing subtracted from 8, doth leaue 7 $\frac{1}{5}$ as by practise doth plainely appeare.

$$\begin{array}{r} 8 \\ 1 \\ \hline 7\frac{1}{5} \end{array}$$



Or otherwise you shall put 1 vnder 8 with a line betweene, & that will bee $\frac{8}{1}$: then set downe the $\frac{4}{5}$ and the $\frac{8}{1}$ with a crosse betweene them, then you must reduce them into one Denomination by the first Reduction, and you shall finde 4 ouer the $\frac{4}{5}$, and 40 ouer the $\frac{8}{1}$, then

then subtract the said 4 from 40, and there will remaine 36, the which you shall set ouer the crosse, and they doe make $\frac{36}{5}$. Likewise you must multiplie the Denominator 5 by 1 maketh 5, set that vnder the crosse, then diuide 36 by 5, and thereof will come $7\frac{1}{5}$ as before, for the rest of that subtraction, as here by practise appeareth.



3 If you will subtract broken number from whole number and broken: as if you would subtract $\frac{3}{4}$ from $6\frac{5}{6}$ you may by the first subtractiō, abate $\frac{3}{4}$ from $\frac{5}{6}$ and there will remaine $\frac{1}{12}$, & the 6 doth still remain whole, because the $\frac{3}{4}$ may well bee abated from the $\frac{5}{6}$,

 and

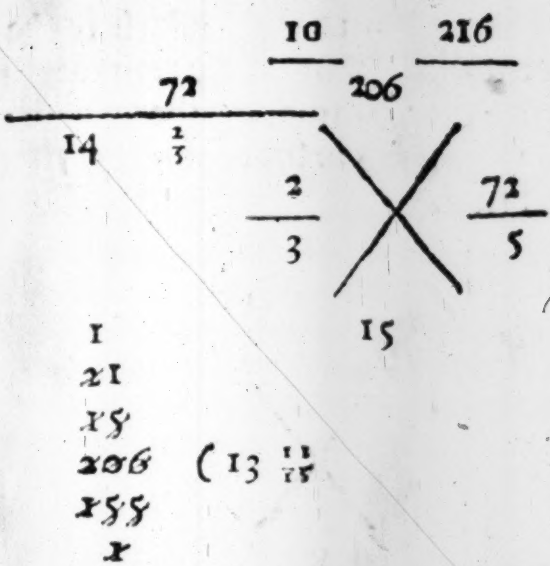
and thus $\frac{3}{4}$ bæing abated from 6 $\frac{5}{6}$ leaueth 6 $\frac{1}{12}$, as appeareth by practise.

$$\begin{array}{lll|ll} 6 & \frac{5}{6} & & 18 & 20 \\ 0 & \frac{3}{4} & & 2 & \\ 6 & \frac{1}{12} & & & \end{array}$$

$$\frac{3}{4} \times \frac{5}{6} \quad \frac{1}{12}$$

$$24$$

Likewise if you will abate $\frac{2}{3}$ from 14 $\frac{2}{5}$, you must first reduce 14 $\frac{2}{5}$ all into fifts by the 6 reduction, and they be $\frac{72}{5}$ then reduce $\frac{2}{3}$ and $\frac{72}{5}$ into a common denomination, by the first reduction, and you shall finde $\frac{10}{15}$ for the $\frac{2}{3}$ and $\frac{216}{15}$ for the $\frac{72}{5}$: then subtract the numerator 10 of the first fraction from 216 of the second fraction, & there remaineth $\frac{206}{15}$. Therefore diuide 206 by 15, and thereof commeth 13 $\frac{11}{15}$, & so much remaines of this subtraction as may appeare in the next page following.



4 If you will subtract whole number and broken, from whole and broken, as thus,, if you will subtract $9\frac{1}{4}$, from $20\frac{1}{2}$, you must reduce $9\frac{1}{4}$ into fourths, and likewise the $20\frac{1}{2}$ into halfes by the first reduction: and you shall find $\frac{37}{4}$ for the $9\frac{1}{4}$, and $\frac{41}{2}$ for the $20\frac{1}{2}$. Then reduce $\frac{37}{4}$, and $\frac{41}{2}$ into one Denomination, according unto the first reduction, and you shall finde $\frac{74}{8}$ for the $\frac{37}{4}$, and $\frac{164}{8}$ for the $\frac{41}{2}$ then abate the numerator of $\frac{74}{8}$,

which is 74 from 164, which is the numerator of $\frac{164}{8}$ and there remaineth $\frac{90}{8}$ then diuide 90 by 8, and therof commeth 11 $\frac{1}{4}$ which is the remaine of this subtraction.

$\frac{37}{9\frac{1}{4}}$ | $\frac{41}{20\frac{1}{2}}$ | $\frac{74}{}$ 90 $\frac{164}{}$

$\frac{37}{4} \times \frac{41}{2}$

8

$$\begin{array}{r} 164 \\ 74 \\ \hline 90 \end{array} \qquad \begin{array}{l} \cancel{1}2 \\ \cancel{9}\cancel{0}\ (11\frac{1}{4} \\ \cancel{8}\cancel{8} \end{array}$$

Subtraction of broken Numbers of broken, from fractions of fractions.

5 If you will subtract the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{5}$ from the $\frac{5}{8}$ of $\frac{3}{4}$ of $\frac{7}{8}$, you must first bring the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{5}$ into one fraction, by the 3 reduction: and the $\frac{5}{8}$ of $\frac{3}{4}$ of $\frac{7}{8}$ likewise into one fraction by the same Reduction, and you shall finde $\frac{6}{30}$ for

the

the firſt 3 broken numbers, which being abbreuied doe make $\frac{1}{5}$: and for the other 3 broken Numbers, you ſhall find $\frac{105}{192}$: which béeing likewiſe abbreuied doe make $\frac{35}{64}$: then you ſhall ſubtract $\frac{1}{5}$ from $\frac{35}{64}$ by the inſtruction of the firſt Subtraction, in reducing both the fractions into a common denomination, as before is done, and you ſhall finde remaining $\frac{111}{320}$ as may appeare by example.

$$\frac{6}{\frac{1}{5}\ \frac{2}{5}\ \frac{3}{5}} \Big/ 30 \quad \Big|\ \frac{1}{5}\ \Big| \quad \frac{105}{\frac{5}{8}\ \frac{3}{4}\ \frac{7}{8}} \Big/ 192 \quad \frac{35}{64}$$

64 175

111

$$\frac{1}{5} \times \frac{35}{64} \qquad \begin{array}{r} 175 \\ 64 \\ \hline 111 \end{array}$$

320

Chap.6.

Of Multiplication in broken Numbers.

First for to multiply in broken Number, there is a Rule which is thus, you must multiply the numerator of the one fraction, by the numerator of the other. And likewise you must multiply the Denominator of the one, by the denominator of the other. And then diuide the fraction if it may be diuided, or else abbreuiate it, if it may be abreuied, and it is done. But if there bée whole number and broken together, you must reduce the whole numbers into their broken, and adde thereunto the numerator of his broken, and then multiply as is before sayd, as also héereafter by examples shall more plainely appeare.

1 If you will multiply $\frac{2}{3}$ by $\frac{3}{4}$, you must multiply the numerator 2 by the numerator 3, and thereof commeth 6, for the numerator. Likewise you must multiply the Denominators the one

by

by the other, that is to say, 3 by 4, and thereof commeth 12 for the denominator: so that the multiplication cometh to $\frac{6}{12}$, which being abreuied doe make $\frac{1}{2}$: and so much amounteth the multiplication of the $\frac{2}{3}$ by $\frac{3}{4}$, as by practise appeareth.

$$\begin{array}{ccc} & 6 & \\ \frac{2}{3} & \overline{\qquad\qquad} & \frac{3}{4} \\ & 12 & \end{array} \qquad \begin{array}{c} 1 \\ \frac{6}{12} \\ 2 \end{array}$$

2 Likewise if you will multiply a broken number by whole number, or whole number by broken, which is all one as $\frac{4}{5}$ by 18, or else 18 by $\frac{4}{5}$, set 1 vnder 18, thus $\frac{18}{1}$, and then multiply the numerator 18, by the numerator 4, and thereof commeth 72. Likewise multiplie the Denominator 5, by the denominator 1, & thereof commeth 5, then diuide 72 by the Denominator 5, and thereof commeth $14\frac{2}{5}$ for ẏ whole multiplication. Or otherwise, abate from 18 his $\frac{1}{5}$ part, which is $3\frac{3}{5}$, & there remaineth $14\frac{2}{5}$, as hereafter foloweth

72		2	
$\frac{4}{5}$	$\frac{18}{1}$	72	(14 $\frac{2}{5}$
5		55	

Or otherwise.

18		3		18
$\frac{18}{1}$	$\frac{1}{5}$	18	(3 $\frac{3}{5}$	3 $\frac{3}{5}$
5		5		14 $\frac{2}{5}$

3 Also if you will multiply a whole number, by whole number & broken, or else whole Number and broken by a whole number, which is all one, as by example, if you will multiply 15 by 16 $\frac{3}{4}$ or else 16 $\frac{3}{4}$ by 15 : First reduce 16 $\frac{3}{4}$ all into fourths, in multiplying 16 by the Denominator of $\frac{3}{4}$ which is 4, and thereof commeth 64, whereunto adde the Numerator 3, and it maketh $\frac{67}{4}$: which multiplie by $\frac{15}{1}$ according to the instruction of the last example, and you shall finde the product of this multiplication to bee 251 $\frac{1}{4}$ as by practise in the next page following doth appeare.

67	1005	67	x 1	
16 $\frac{3}{4}$	$\frac{67}{4}$ $\frac{15}{1}$	15	x005	(251 $\frac{1}{4}$
	4	335	444	
		67		
		1005		

4. And if you will multiply a broken number, by whole number & broken, or else whole number and broken by a broken. Example. If you will multiply $\frac{1}{4}$ by 18 $\frac{2}{3}$ or else 18 $\frac{2}{3}$ by $\frac{1}{4}$ which is all one: you must reduce the whole number into his broken by the Sixt Reduction, and you shall find $\frac{56}{3}$, which you shall multiplie by the $\frac{1}{4}$ after the doctrine of the first multiplication, that is to say: in multiplying the Numerator 56, by the Numerator of $\frac{1}{4}$, which is 1: and it is still 56, because 1 doth neither multiplie nor divide. And likewise you must multiplie the denominator 3 by the Denominator 4, and it maketh 12: then divide 56 by 12, and thereof commeth 4 $\frac{2}{3}$. And so much amounteth the multiplication of the said 18 $\frac{2}{3}$ multi-

$\frac{2}{3}$ multiplied by $\frac{1}{4}$, as by example.

	56	56		
18	$\frac{2}{3}$	$\frac{65}{3}$	$\frac{1}{4}$	x8
				56 (4 $\frac{2}{3}$
		12		x2

5 If you wil multiply whole number and broken, with whole and broken, you must first put either whole number into his broken, according to the instruction of the Sixt Reduction, and then multiply the one numerator by the other, and of the product make your numerator. And likewise multiply the denominators the one by the other, and thereof make the denominator, then diuide the numerator by the denominator, and the quotient shall be the increase of this multiplication. Example if you would multiply 12 $\frac{4}{5}$ by 6 $\frac{3}{4}$: first by the sixt reduction the 12 $\frac{4}{5}$ will make $\frac{64}{5}$: and the 6 $\frac{3}{4}$ will make $\frac{27}{4}$ then multiply the numerator 64, by the numerator 27, and thereof cometh 1728 for the numerator. And then you must multiplie the denomi-

nator

nator 5, by the denominator 3, & they doe make 20: then diuide 1728, by 20, & thereof commeth 86 $\frac{2}{5}$, for the whole multiplication, as by example.

1728		64	x
64	27	27	x728
12 $\frac{4}{5}$	6 $\frac{3}{4}$	448	200 (86 $\frac{2}{5}$
		128	x
20		1728	

6 If you will multiplie one broken Number by many broken numbers thus: As to multiply $\frac{2}{3}$ by $\frac{5}{7}$ and by $\frac{4}{9}$, you must multiplie the numerators of all the fractions, the one by the other, & of the product make the numerator, that is to say, 2 by 5, and they bee 10, then 10 by 4, & they bee 40 for the Numerator. Likewise you must multiply the denominators the one by the other, that is to say, 3 by 7 maketh 21, then 21 by 9 maketh 189, for the denominator: then set 40 ouer the 189 with a line betweene them, and they make $\frac{40}{189}$. And so much amounteth the

the whole multiplication of the $\frac{2}{3}$ multiplied by $\frac{5}{7}$ and $\frac{4}{9}$ as by example following. And this is to be vnderstood of all ſuch like.

	2	3
	5	7
40	10	21
$\frac{2}{3}$ $\frac{5}{7}$ $\frac{4}{9}$	4	9 $\frac{40}{189}$
189	40	189

Chap. 7.

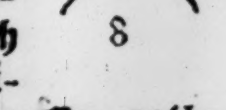
Of Diuiſion in broken Numbers.

Note that in diuiſiō of broken numbers, you muſt ſet your Diuiſor downe firſt, next vnto the left hand, and the diuidend or nūber which is to be diuided, alwaies toward the right hand. And then multiplie croſſe-wiſe, that is to ſay, the numerator of your diuiſor, by the denominator of the diuidend: & the product ſhall be the denominator, which afterward ſhall be your diuiſor.

And

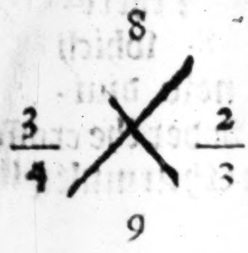
And likewise you must multiply the Denominator of your first Number, that is to say, of your Diuisor, by the Numerator of the diuidend, which afterward shall bee the Diuidend, and that must bee set ouer the crosse, and the denominator vnder the crosse, then diuide the numerator by the Denominator if it may be diuided, if not, you must abreuiate them, as héereafter by examples shall more plainly appeare.

1. If you will diuide $\frac{3}{4}$ by $\frac{2}{3}$, you most set the diuisor (which is $\frac{2}{3}$) next to the left hand, and the Diuidend $\frac{3}{4}$ toward your right hand, with a crosse betwéene them: as may appeare by this example in the margent. Then you shall multiplie the Numerator of the $\frac{2}{3}$, which is 2 by the Denominator of the $\frac{3}{4}$ which is 4 & thereof commeth 8 which shall be your new diuisor:



set that 8 vnder the crosse, as the denominator: then multiplie the numerator

merator of the diuidend, that is to say of the $\frac{3}{4}$ which is 3 by the denominator of the diuisor, that is to wit, of the $\frac{2}{3}$ which is 3, and therof commeth 9, set the 9 ouer the crosse of the numerator which shall be now the diuidend or number to be diuided. ¶ Then finally you shall diuide 9 by 8, & thereof cometh into the quotient $1\frac{1}{8}$, and so oftentimes is $\frac{2}{3}$ contained in $\frac{3}{4}$, as doth appeare before in the Margent. But in case you would diuide $\frac{2}{3}$ by $\frac{3}{4}$, you must likewise set your diuisor $\frac{3}{4}$ next to your left hand, as is before sayd. And then procede as is aboue declared, & you shall find that $\frac{2}{3}$ diuided by $\frac{3}{4}$ bringeth into the quotient $\frac{8}{9}$, which cannot bee diuided nor abbreuied. Wherefore it appeareth that $\frac{2}{3}$ being diuided by $\frac{3}{4}$, bringeth but $\frac{8}{9}$ of one vnity into the quotient, as appeareth.



2 Likewise if you will diuide a broken number by a whole Number, or else a whole number by a broken, as to diuide $\frac{3}{4}$ by 13, you shall put 1 vnder 13, and it will be $\frac{13}{1}$ for your diuisor, set yͭ toward your left hand, and then multiply 13 by 4 according to yͤ first diuision, and thereof will com 52, for the denominator, set that vnder the crosse: and multiplie 3 by 1, maketh 3, for the numerator: set that ouer the crosse, and it is $\frac{3}{52}$, as appeareth aboue.

$$\begin{array}{ccc} & 3 & \\ \frac{13}{1} & \times & \frac{3}{4} \\ & 52 & \end{array}$$

But if you will diuide 13 by $\frac{3}{4}$, then set the $\frac{3}{4}$ next your left hand, and put one vnder 13, as in the last example, & it is $\frac{13}{1}$, set that toward your right hand thus, as appeareth in the margent, and then work according to the doctrine of the first Diuision, and

$$\begin{array}{ccc} & 52 & \\ \frac{3}{4} & \times & \frac{13}{1} \\ & 3 & \end{array}$$

you

you shall finde that 13 being diuided by $\frac{3}{4}$ bringeth into the quotient $\frac{52}{3}$ then diuide 52 by 3, and thereof commeth 17 $\frac{1}{3}$, and so oftentimes is $\frac{3}{4}$ contained in 13, as doth appeare.

$\cancel{2}$ 1
5 $\cancel{2}$
$\cancel{3}$ $\cancel{3}$ (17 $\frac{1}{3}$

3 And if you wil diuide whole number by whole number and broken, or else whole number & broken by whole number, as to diuide 20 by 5 $\frac{5}{6}$ you shall reduce 5 $\frac{5}{6}$ into broken by the first reduction, and it maketh $\frac{35}{6}$ for your diuisor, then put 1 vnder 20, & it will be $\frac{20}{1}$ then shall you multiplie 35, by 1, and 20 by 6, as is taught in the other diuisions, and you shall finde $\frac{120}{35}$: then diuide 120 by 35, and you shall finde in your quotient 3, and $\frac{15}{35}$ the which $\frac{15}{35}$ being abbreuied, is $\frac{3}{7}$, and so many times is 5 $\frac{5}{6}$ contained

120

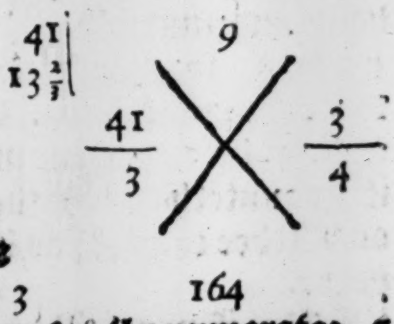
$\frac{35}{6}$ $\frac{20}{1}$

35
1
$\cancel{3}$ 5
$\cancel{1}$ $\cancel{2}$ $\cancel{0}$ (3 $\frac{15}{35}$
$\cancel{3}$ $\cancel{5}$

ned in 20 as in the margent apeareth.

But if you will diuide 5 $\frac{5}{6}$ by 20, you shall haue $\frac{35}{120}$ then you must diuide 35 by 120, which you cannot diuide, wherefore you shall abbreuiate $\frac{35}{120}$ and thereof commeth $\frac{7}{24}$ for your quotient.

4 If you will diuide a broken number by whole number and broken, or else whole number and broken, by a broken number. As to diuide $\frac{3}{4}$ by 13 $\frac{2}{3}$ you must reduce 13 $\frac{2}{3}$ into his broken, by the first reduction, and they be $\frac{41}{3}$ for your diuisor, then multiplie 41 by 4, & they make 164 for your denominator likewise multiplie 3 by 3



and they make 9 for the numerator, & then will your summe bee $\frac{9}{164}$, as appeareth in the worke afore noted. But if you will diuide 13 $\frac{2}{3}$ by $\frac{3}{4}$ then you must diuide 164 by 9, and you shall

finde 18 $\frac{2}{3}$.

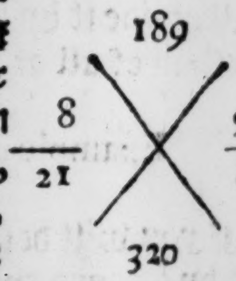
5. If you will diuide whole number and broken, by whole number, and broken, as to diuide 7 $\frac{3}{4}$ by 13 $\frac{2}{3}$, you must reduce the whole Numbers into their broken, by the doctrine of the first Reduction, and you shall finde $\frac{31}{4}$ for the 7 $\frac{3}{4}$ and $\frac{41}{3}$ for the 13 $\frac{2}{3}$: Then set downe $\frac{41}{3}$ toward the left hand because it is your diuisor, and the $\frac{31}{4}$ towardes the right hand, and multiply 41 by 4, for your denominator: and thereof commeth 164. Likewise multiplie 31 by 3, for your numerator, and it amounteth to 93: the which diuision will bee thus $\frac{93}{164}$ as before doth appeare.

But if you will diuide 13 $\frac{2}{3}$ by 7 $\frac{1}{4}$ you must (contrariwise to the other example) diuide 164, by 93: and you shall find in the quotient 1 $\frac{71}{93}$.

6. The broken numbers of broken,

must

must be diuided in such manner as broken nũbers are, and there is no difference, sauing onely that of diuers and many broken numbers, you must make but two broken numbers, that is to say, the one for the diuisor, & the other for the diuidend, or number that is to bee diuided: examp. If you will diuide the $\frac{3}{4}$ of $\frac{3}{5}$ of $\frac{1}{2}$ by the $\frac{2}{3}$ of $\frac{4}{7}$, you must vnderstand, that for the first, the $\frac{3}{4}$ of $\frac{3}{5}$ of $\frac{1}{2}$ are $\frac{9}{40}$ by the third Reduction and the $\frac{2}{3}$ of $\frac{4}{7}$ are by the same reduction $\frac{8}{21}$ then haue you $\frac{8}{21}$ for your diuisor, & $\frac{9}{40}$ for your number to bee diuided, then multiplie 8 by 40, which maketh 320, set yͤ vnder the crosse & multiplie 9 by 21,



and thereof commeth 189: which set ouer the crosse for the numerator, and they make $\frac{189}{320}$ for his diuision, as doth appeare.

But if you would diuide $\frac{8}{21}$ by $\frac{9}{40}$ you must worke contrary to the last

Example, that is to say, you must diuide 320 by 189: and thereof commeth in the quotient $\frac{131}{189}$.

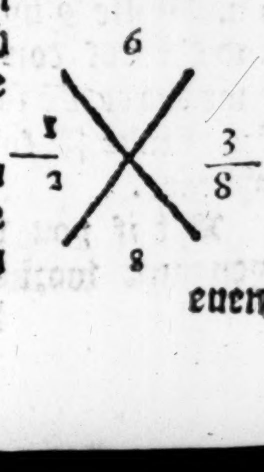
Chap. 8.

Treateth of Duplation. Triplation, *Quadruplation of all broken numbers.*

If you will double any broken number, you shall diuide ÿ same by $\frac{1}{2}$: likewise if you will triple any fraction, you must diuide it by $\frac{1}{3}$. And for to quadruple any broken number, you shall diuide it by $\frac{1}{4}$, and so is to be understood of all other.

Example of Duplation.

If you will double $\frac{3}{8}$ you shal diuide $\frac{3}{8}$ by $\frac{1}{2}$, and thereof commeth $\frac{6}{8}$, which being abreuied, are $\frac{3}{4}$: as by example.



Or otherwise, in case the denominator of any fraction bee an

euen number, you may take halfe the said denominator, without any other operation, and the numerator to abide still the numerator, vnto the said half of the Denominator of the Fraction, as by the other example before rehersed, that is to say, of $\frac{3}{8}$ take $\frac{1}{2}$ of 8, which is 4: and that is the denominator, & 3 remaineth still numerator to 4 and it maketh $\frac{3}{4}$ & so of all other. But in case the Denominator bee an odde number, that is to say. not euen, then you may multiplie the numerator by 2, or else double the numerator, which is all one thing, and that fraction shall be doubled. Example, if you will double $\frac{3}{5}$ you must onely multiplie the numerator 3, by 2, and they be 6: which maketh that fraction to be $\frac{6}{5}$ the which 6 being diuided by 5, bringeth 1 $\frac{1}{5}$ and so much is the double of $\frac{3}{5}$.

Example of Triplation.

If you will triple $\frac{3}{5}$ you must diuide $\frac{3}{5}$ by $\frac{1}{3}$ and thereof commeth $\frac{9}{5}$ which

being diuided bringeth 1 $\frac{4}{5}$ or otherwise, because the denominator is an odde number, you may multiply the numerator 3 by 3, and thereof commeth 9 which maketh $\frac{9}{5}$ as before appeared.

Example of Quadruplation.

If you will quadruple $\frac{4}{5}$ you shall diuide $\frac{4}{5}$ by $\frac{1}{4}$ and thereof commeth $\frac{16}{5}$ which 16 being diuided by 5 bringeth 3 $\frac{1}{5}$ or otherwise, because the denominator of the fraction in an od number, you shall multiplie the Numerator of the $\frac{4}{5}$ that is to say, 4 by 4, and thereof commeth 16: the which diuide by 5, and you shall find 3 $\frac{1}{5}$ as before. And this sufficeth for Duplation, Triplation, and Quadruplation.

Chap. 9.
Of the proofes of broken Numbers, *And first of Reduction.*

If you doe abbreuiate the broken Numbers which bee reduced, you

shall

shall returne them into their first estate: as by Example, if you reduce $\frac{2}{3}$ with $\frac{4}{5}$ you shall finde $\frac{10}{15}$ and $\frac{12}{15}$, then abbreuiate $\frac{10}{15}$ and you shall find $\frac{2}{3}$ abbreuiate likewise $\frac{12}{15}$ and thereof commeth $\frac{4}{5}$ as before.

The proofe of Abbreuiation.

If you doe multiplie that Number which you haue abbreuied, by that or those Numbers, by the which you haue abbreuied them, you shall returne them againe into their first estate. Example, if you will abbreuiate $\frac{32}{48}$ by 16, in taking the $\frac{1}{16}$ part both of the numerator, and also of the denominator, you shall find $\frac{2}{3}$ the proofe is thus, you must multiplie both the numerator and denominator of $\frac{2}{3}$ that is to say 3 by 16 maketh 48 for the denominator, and 2 by 16, maketh 32 for the numerator: then set the numeratar 32, ouer the denominator 48, and they be $\frac{32}{48}$ as before.

If you doe subtract one of the numbers, or many of them (which you haue added) from the totall summe, there shal remain the other, or others. Example, if you do add $\frac{1}{3}$ with $\frac{1}{4}$, you shall finde $\frac{7}{12}$. The proofe is, if you subtract $\frac{1}{3}$ from $\frac{7}{12}$, you shall finde remaining the other number, which is $\frac{1}{4}$ or else if you doe subtract $\frac{1}{4}$ from $\frac{7}{12}$ there will remaine the other number which is $\frac{1}{3}$.

The proofe of Substraction.

If you doe adde that number which remaineth, with the Number which you did subtract, you shall finde the totall Summe, out of the which you made the abatement: or otherwise, if you adde the two lesser Numbers together, you shall finde the greater. Example: if you do subtract $\frac{1}{4}$ from $\frac{1}{3}$ there will remaine $\frac{1}{12}$. The proofe is thus, you must adde $\frac{1}{12}$ and $\frac{1}{4}$ together, and you shall finde $\frac{16}{48}$ the which beeing abbreuied, doth make $\frac{1}{3}$ which is

is the greatest number.

The proofe of Multiplication.

If you diuide the product of the whole multiplication, by ỹ multiplicator, you shall find in your quotient, the multiplicand or number the which you haue multiplied : or else if you diuide the totall Sum which is some of the multiplication, by the multiplicand : you shall find in the quotient the multiplicator. Exam. If you multiplie $\frac{2}{3}$ by $\frac{4}{5}$, the product of this multitiplication will bee $\frac{8}{15}$. The proofe is thus: you shall diuide $\frac{8}{15}$ by the multiplicator $\frac{4}{5}$ and thereof commeth $\frac{2}{3}$ which is the multiplicand, or else diuide $\frac{8}{15}$ by $\frac{2}{3}$ and you shall finde the $\frac{4}{5}$ which is the multiplicator.

The proofe of Diuision.

If you do multiplie the quotient by the diuisor, you shall find the number which you did diuide, that is to say,

your

your diuidend. Example, if you diuide $\frac{2}{3}$ by $\frac{3}{4}$ your quotient will bee $\frac{8}{9}$ the proofe is thus, you must multiplie $\frac{8}{9}$ by $\frac{3}{4}$ and thereof commeth $\frac{24}{38}$ which being abreuied are $\frac{2}{3}$ which is your diuidend, and by this maner all whole numbers haue their proofes as well as broken numbers.

Chap. 10.

Of certaine questions done by broken numbers. And first by Reduction.

Find 2 numbers wherof the $\frac{2}{7}$ of the one number may be equal vnto the $\frac{3}{8}$ of the other. Answ. You shall reduce $\frac{2}{7}$ & $\frac{3}{8}$ crossewise, and you shall find 16 ouer the $\frac{2}{7}$ and 21 ouer the $\frac{3}{8}$ which are the two numbers that you seeke: for the $\frac{3}{8}$ of 16 are 6: and so are the $\frac{2}{7}$ of 21, likewise 6: wherefore you may perceiue that the $\frac{3}{8}$ of 16 which are 6: are equall vnto the $\frac{2}{7}$ of 21, which is also 6.

2. Find two numbers, wherof the $\frac{2}{3}$ of

$\frac{2}{3}$ of the one, may be double to the $\frac{1}{4}$ of the other. Anſwer. Double $\frac{1}{4}$ and you ſhall haue $\frac{2}{4}$, which béeing abbreuied is $\frac{1}{2}$: then reduce $\frac{2}{3}$ and $\frac{1}{2}$ croſſe-wiſe, and you ſhall find 4 ouer the $\frac{2}{3}$ and 3 ouer the $\frac{1}{2}$, which are the 2 Numbers that you ſéeke. For the $\frac{2}{3}$ of 3, which is 2 is double vnto the $\frac{1}{4}$ of 4, which is but 1.

3. Find two numbers whereof the $\frac{2}{3}$ and the $\frac{1}{4}$ of the one, may be equall vnto the $\frac{1}{4}$ & $\frac{1}{5}$ of the other. Anſwer. Adde the $\frac{2}{3}$ and $\frac{1}{4}$ together, and they make $\frac{7}{12}$ then adde $\frac{1}{4}$ and $\frac{1}{5}$ together, & they are $\frac{9}{20}$: then reduce $\frac{7}{12}$ and $\frac{9}{20}$ croſſewiſe, and you ſhall haue 140 ouer the $\frac{7}{12}$ and 108 ouer the $\frac{9}{20}$, which are the two Numbers that you ſéeke. For 63 which are the $\frac{7}{12}$ of 108, are alſo the $\frac{9}{20}$ of 140.

4. Find two numbers, whereof the $\frac{1}{2}$ the $\frac{1}{3}$ and the $\frac{1}{4}$ of the one of them, may be equall vnto the $\frac{1}{5}$ and $\frac{1}{6}$ and $\frac{1}{7}$, of the other number. Anſwere. Firſt you muſt adde $\frac{1}{2}$ $\frac{1}{3}$ and $\frac{1}{4}$ together, and they make $\frac{13}{12}$: then adde $\frac{1}{5}$ $\frac{1}{6}$ and $\frac{1}{7}$ together,

gether, and they make $\frac{107}{210}$. Then re-duce $\frac{13}{12}$ and $\frac{107}{210}$ crosse-wise, as by the first question of Reduction, and you shall finde 2730 ouer the $\frac{13}{12}$, and 1284 ouer the $\frac{107}{210}$ which are the two Numbers that you seeke: for 1391 which is the $\frac{1}{2}$ the $\frac{1}{3}$ the $\frac{1}{4}$ of 1284: is like to the $\frac{1}{5}$ $\frac{1}{6}$ and $\frac{1}{7}$ of 2730, which is also 1391.

5. Find thrée Numbers, whereof the $\frac{2}{5}$ of the first, the $\frac{3}{7}$ of the second, & the $\frac{4}{9}$ of the third, may bee equall the one to the other. Answere. Set downe the $\frac{2}{5}$ $\frac{3}{7}$ and $\frac{4}{9}$, and then multiplie the Denominator of the $\frac{2}{5}$ that is to say, 5 by the Numerators of the other two Fractions, that is to say, by the numerator of $\frac{3}{7}$ and by the Numerator of $\frac{4}{9}$ which is 3 and 4, and thereof commeth 60 for your first Number: then shall you multiplie the Denominator of the $\frac{3}{7}$ which is 7, by the numerators of $\frac{2}{5}$ and $\frac{4}{9}$ that is to say, by 2 and 4 and thereof commeth 56, for the second Number. Then multiplie the denominator of $\frac{4}{9}$ that is to say, 9

by

by the numerator of $\frac{2}{5}$ and $\frac{3}{5}$, that is by 2 and 3, and thereof commeth 54, for the third number. And thus the $\frac{2}{5}$ of 60, which is 24, is likewise the $\frac{3}{7}$ of 56, which is the second number, and is also the $\frac{4}{9}$ of 54, which is the third number.

6. Finde thrée numbers, of which the first and the second may be in such proportion as $\frac{1}{2}$ and $\frac{1}{3}$ and the second & third in such proportion as $\frac{1}{4}$ and $\frac{1}{5}$. Answere. Reduce $\frac{1}{2}$ and $\frac{1}{3}$ crossewise, and you shall haue 3 ouer the $\frac{1}{2}$, and 2 ouer the $\frac{1}{3}$ then reduce $\frac{1}{4}$ and $\frac{1}{5}$ in like manner, and you shall find 5 ouer the $\frac{1}{4}$ and 4 ouer the $\frac{1}{5}$. Then say by the Rule of thrée, if 5 doe giue me 4, what shall 2 giue mee, which is the second proportionall, multiplie the second Number 4, by the third number 2, and thereof commeth 8, the which diuide by the first number 5, & thereof commeth 1 $\frac{3}{5}$ for the third proportionall: and you shall find that 3, 2, 1 $\frac{3}{5}$, are the thrée Numbers proportionall that I demand, or else 15, 10, and 8,

in

in whole numbers.

Questions done by Addition in *Fractions.*

VVHat Number is that, unto the which if you adde 13 the whole amounteth to 31? Ans. Subtract 13 from 31, & there will remaine 18, which is the number you seeke.

2 What number is that, unto the which if you adde $\frac{2}{5}$ the addition will bee $\frac{5}{6}$? Answere. Abate $\frac{2}{5}$ from $\frac{5}{6}$ and there will remaine $\frac{13}{30}$, which is the number that you desire.

3. What number is that, whereunto if you adde 7 $\frac{2}{3}$, the whole addition will be 12 $\frac{1}{4}$? Answe. Abate 7 $\frac{2}{3}$ from 12 $\frac{1}{4}$ and the remaine will bee 4 $\frac{7}{12}$, which is the numbar that you desire to know.

4. What number is that whereunto if you adde the $\frac{3}{4}$ of it selfe, that is to say, of the Number that you seeke the whole addition may bee $\frac{5}{6}$? Ans. Heere followeth a generall rule for all

all such like questions. First of 3, which is ẏ numerator of $\frac{3}{4}$ make that still the numerator: and likewise of 3 and 4 added together, which is both ẏ numerator, and the denominator, of the $\frac{3}{4}$ make them your denominator: so you shall finde $\frac{3}{7}$: then take the $\frac{3}{7}$ of $\frac{5}{8}$ which is $\frac{15}{42}$ or $\frac{5}{14}$ & then substract them from $\frac{5}{8}$ & there will remaine $\frac{16}{51}$ which is the number that you seeke.

5. What number is that, unto the which if you adde his owne $\frac{a}{3}$ that is to say, $\frac{2}{3}$ of it selfe, the whole addition shall be 20? Answ. Doe as in the last question, of the numerator of $\frac{2}{3}$ that is to say, of 2, make still your numerator: & likewise of the numerator 2 and the denominator 3 of the $\frac{2}{3}$ make of them both, your denominator: and you shall find $\frac{2}{5}$ then take the $\frac{2}{5}$ of 20 which are 8, and abate them from 20, & there will remaine 12: which is the number that you desire. And so it is to be done of all such like reasons.

Questions done by Substraction in Fractions.

WHat number is that, frō the which if you do abate 17 the rest may bee 19? Ans. Adde 17 and 19 together, & you shall find 37, which is the number that you seeke.

2 What number is that, from the which if you abate $\frac{3}{5}$ the rest may bee $\frac{1}{8}$? Answ. Adde $\frac{3}{5}$ and $\frac{1}{8}$ together, and you shall find $\frac{27}{40}$ which is the number that you demand.

3 What number is that, from the which if you reduce $13\frac{1}{2}$ the rest may bee $5\frac{5}{7}$? Answer. Adde $13\frac{1}{2}$ and $5\frac{5}{7}$ together, and thereof commeth $19\frac{3}{14}$ which is the number that you seeke.

4 What number is that, from the which if you substract his $\frac{2}{5}$ that is to say $\frac{2}{5}$ of it selfe, the rest may bee 12? Answer. And a rule for such like reasons: that is to say, from the denominator of $\frac{2}{5}$ which is 5 abate 2 which is his numerator, & there resteth 3 for the denominator, and thus of $\frac{2}{5}$ you have now made $\frac{2}{3}$ then take the $\frac{2}{3}$ of

12

12 which are 8, and adde them unto 12, and thereof commeth 20, for the number which you desire.

5 What number is that, from the which if you doe abate his $\frac{3}{4}$ the rest may be $\frac{8}{5}$? Answer. From the denominator of $\frac{3}{4}$ which is 4, substract his numerator 3 and there resteth 1, thus of $\frac{3}{4}$ you haue made $\frac{3}{1}$. Then multiplie $\frac{3}{1}$ by $\frac{8}{5}$, and thereof commeth $2\frac{2}{5}$ the which adde unto $\frac{8}{5}$ and you shall haue $3\frac{5}{5}$, which is the Number that you seeke.

6 What number is that, from the which if you abate his $\frac{4}{5}$ the rest may bee $12\frac{2}{3}$? Answere. Doe as you did in the last question, and you shall find that the $\frac{4}{5}$ wilbe $\frac{4}{1}$: And therfore multiplie $12\frac{2}{3}$ by $\frac{4}{1}$ and thereof commeth $50\frac{2}{3}$ the which adde unto $12\frac{2}{3}$ and you shall find $63\frac{1}{3}$ for the number that you demaund. And thus of all such like Questions.

Questions of Multiplication in Fractions.

VVHat number is that, which bæing multiplied by 13, the whole product of that multiplication shall make 221? Answ. Diuide 221 by 13, and thereof commeth 17, which is the number that you sæke.

2 What number is that which being multiplied by 15 the whole multiplication will amount to $\frac{3}{4}$? Answer. Diuide $\frac{3}{4}$ by $\frac{15}{1}$ and thereof commeth $\frac{1}{20}$ which is the number that you sæk.

3 What number is that which being multiplied by 21, the whole multiplication will be 16 $\frac{4}{5}$? Answ. Diuide 16 $\frac{4}{5}$ by $\frac{21}{1}$ and you shall find $\frac{4}{5}$ and that is the number that you demand.

4 What number is that, which being multiplied by $\frac{3}{4}$ the multiplication will amount to 18? Answ. Diuide $\frac{18}{1}$ by $\frac{3}{4}$ and thereof commeth 24 which is the number that you desire to know.

5 What number is that, which if

it

it bee multiplied by $\frac{2}{3}$ the whole multiplication will be $\frac{1}{4}$? Answ. Diuide $\frac{1}{4}$ by $\frac{2}{3}$ and the quotient will be $\frac{3}{8}$ which is the Number that you requirs to know.

6 What number is that, which being multiplied by $\frac{5}{8}$ the product of the multiplication will be 16 $\frac{2}{3}$? Answer. Diuide 16 $\frac{2}{3}$ by $\frac{5}{8}$ and thereof commeth 26 $\frac{2}{3}$ which is the number that you seeke.

Heere ensueth other necessary questions, which are wrought by Multi-*plication in broken numbers.*

I Demand how much the $\frac{5}{8}$ of 20 shil. are worth, or what are the $\frac{5}{8}$ of 20 shillings? Answ. You must multiplie $\frac{5}{8}$ by $\frac{20}{1}$ and the product will bee $\frac{200}{8}$ therefore diuide 1 10 by 8, and thereof commeth 12 $\frac{2}{4}$ which is to say, 12 s. 6 d. and so much are the $\frac{5}{8}$ of 20 shillings worth.

2 I demaund what the $\frac{3}{4}$ of $\frac{1}{2}$ of a pound of money are worth? That is

to say of 20 s. Answer. Multiplie $\frac{3}{4}$ by $\frac{5}{8}$ and thereof commeth $\frac{15}{32}$: Then take the $\frac{5}{8}$ of 20 Shillinges, as in the last Question going before, and you shall finde 12 s. 6 pence, and so much are $\frac{3}{4}$ of $\frac{5}{8}$ of 20 s. worth.

3 I demaund what the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ are worth? Answere. Multiplie 8 $\frac{1}{2}$ by $\frac{2}{3}$ or else $\frac{2}{3}$ by 8 $\frac{1}{2}$ which is all one, and you shall find $\frac{34}{6}$. Then diuide 34 by 6, and your Quotient will bee 5 pence $\frac{2}{3}$ and so much are the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ worth.

4 What are the $\frac{3}{4}$ of 14 pence $\frac{3}{5}$? Answere. Multiplie 14 $\frac{3}{5}$ by $\frac{3}{4}$ and thereof commeth $\frac{219}{20}$: Therefore diuide 219 by 20, and your quotient will be 10 pence, $\frac{19}{20}$: and so much are the $\frac{3}{4}$ of 14 $\frac{3}{5}$.

5 How many quarters or fourth parts are contained in 7 $\frac{2}{3}$? Answere. Multiplie 7 $\frac{2}{3}$ by $\frac{4}{1}$ (because one whole containeth 4 quarters) and thereof commeth 30 $\frac{2}{3}$ and so many Quarters are in the 7 $\frac{2}{3}$ that is to say, 30 quarters and $\frac{2}{3}$ of a quarter.

6 How

6 How many thirds are in $\frac{3}{4}$ and $\frac{1}{2}$ that is to say, in 3 quarters, and $\frac{1}{2}$ of one quarter? which are $\frac{7}{8}$ by the first Reduction. Answere. Multiplie $\frac{7}{8}$ by $\frac{3}{1}$ (for because that in 1 whole are contained 3 thirds) and thereof commeth 2 $\frac{5}{8}$ the which 2 $\frac{5}{8}$ doe signifie $\frac{2}{3}$ and $\frac{5}{8}$ of a third: and so many thirds are in $\frac{3}{4}$ and $\frac{1}{2}$ or in $\frac{7}{8}$ which is all one.

Questions done by Diuision in *broken numbers.*

1. What number is that, which béeing diuided by 17, the quotient will bee 13? Answer. Multiplie 17 by 13 and thereof commeth 221, which is the number that you séeke.

2. What number is that, which béeing diuided by $\frac{3}{4}$, the quotient wil bee 21? Answere. Multiplie $\frac{21}{1}$ by $\frac{3}{4}$ and thereof commeth $\frac{63}{4}$: Then diuide 63 by 4, thereof commeth 15 $\frac{3}{4}$: which is the number that you séeke.

3. What number is that, which béeing diuided by $\frac{1}{7}$, the quotient will

be $\frac{2}{3}$? Answere. Multiplie $\frac{2}{3}$ by $\frac{1}{4}$ and thereof commeth $\frac{2}{12}$: which being abbreviated are $\frac{1}{6}$ for the number which you requite.

4 What number is that, which being diuided by $\frac{4}{5}$ the quotient will bee $16\frac{2}{3}$? Answer. Multiplie $16\frac{2}{3}$ by $\frac{4}{5}$ and thereof commeth $\frac{200}{15}$. Therefore diuide 200 by 15, and thereof commeth $13\frac{1}{3}$ which is the number that you desire to find.

5 What Number is that, which being diuided by $13\frac{1}{3}$ the quotient wil bee 20? Answer. Multiplie $\frac{20}{1}$ by $13\frac{1}{3}$ and thereof commeth $\frac{800}{3}$ then diuide 800 by 3, and thereof commeth $266\frac{2}{3}$: for the Number which you seeke.

6 What number is that, which if it be diuided by $12\frac{1}{2}$ the quotient will be $\frac{7}{8}$? Answ. Multiplie $12\frac{1}{2}$ by $\frac{7}{8}$ and thereof commeth $\frac{175}{16}$: then diuide 175 by 16, and thereof commeth $10\frac{15}{16}$: for the number which you desire.

Other

Other necessary questions done by *Diuision in broken numbers.*

I Demand what part 30 is of 70? An. Diuide 30 by 70, which you cannot, for they are $\frac{30}{70}$ but abbreuiate them, and they are $\frac{3}{7}$: thus 30 are the $\frac{3}{7}$ of 70.

2 I demand what part 10 is of 16 $\frac{2}{3}$? Answere. Diuide $\frac{10}{1}$ by 16 $\frac{2}{3}$ and thereof commeth $\frac{30}{50}$ which béeing abbreuied are $\frac{3}{5}$. And thus 10 is found to be $\frac{3}{5}$ of 16 $\frac{2}{3}$.

3 More $\frac{5}{8}$ of one vnitie, what part are they of 25? Answere. Diuide $\frac{5}{8}$ by $\frac{25}{1}$ and thereof commeth $\frac{5}{200}$ which being abbreuied is $\frac{1}{40}$ and thus $\frac{5}{8}$ of 1, is but the $\frac{1}{40}$ of 25.

4 More $\frac{5}{6}$ what part are they of $\frac{7}{8}$? Answere. Diuide $\frac{5}{6}$ by $\frac{7}{8}$ and you shall find $\frac{40}{42}$ which abbreuied are $\frac{20}{21}$.

5 More $\frac{4}{5}$ of 1, what part are they of 13 $\frac{1}{3}$? Ans. Diuide $\frac{4}{5}$ by 13 $\frac{1}{3}$, and you shall find $\frac{12}{200}$ which being abbreuied are $\frac{3}{50}$. And thus $\frac{4}{5}$ of 1, are the $\frac{3}{56}$ of 13 $\frac{1}{3}$.

6 More 12 $\frac{1}{2}$ what part are they of 30?

30 ? Answere. Diuide 12 $\frac{1}{2}$ by $\frac{30}{1}$ and you shall finde $\frac{25}{60}$, which being abreuied are $\frac{5}{12}$ and thus 12 $\frac{1}{2}$ are the $\frac{5}{12}$ of 30.

7 More, 16 $\frac{2}{3}$ what part are they of 57 $\frac{1}{7}$? Answer. Diuide 16 $\frac{2}{3}$ by 57 $\frac{1}{7}$ & thereof commeth $\frac{350}{1200}$ wich being abbreuied are $\frac{7}{24}$: and thus 16 $\frac{2}{3}$ are the $\frac{7}{24}$ of 57 $\frac{1}{7}$.

8 More $\frac{3}{4}$ and $\frac{2}{3}$ of $\frac{1}{4}$ or 3 Quarters and $\frac{2}{3}$ of one Quarter, what part are they of 1? Answer. Reduce $\frac{3}{4}$ and the $\frac{2}{3}$ of $\frac{1}{4}$ into one broken number by the 5 reduction, and you shall find $\frac{11}{12}$. And thus the $\frac{3}{4}$ and $\frac{2}{3}$ of $\frac{1}{4}$, are the $\frac{11}{12}$ of 1 whole.

9 More, of what number are 9 the $\frac{2}{3}$? Ans. Diuide 9 by $\frac{2}{3}$ and therof commeth 13 $\frac{1}{2}$: which is the nūber wherof 9 are the $\frac{2}{3}$.

10 More of what number are $\frac{2}{5}$ the $\frac{3}{4}$? Answer. Diuide $\frac{2}{5}$ by $\frac{3}{4}$ and therof commeth $\frac{8}{15}$: which is the Number whereof $\frac{2}{5}$ are the $\frac{3}{4}$ of the same Number.

11 More

11 More, of what number are $5\frac{3}{4}$ the $\frac{3}{7}$? Answere. Diuide $5\frac{3}{4}$ by $\frac{3}{7}$ and you shall shall find $13\frac{5}{12}$ which is the number whereof $5\frac{3}{4}$ are the $\frac{3}{7}$.

12 More, $9\frac{2}{3}$ what part are they of $33\frac{1}{2}$? Answere. Diuide $9\frac{2}{3}$ by $33\frac{1}{2}$ and therof commeth $\frac{58}{201}$: and thus $9\frac{2}{3}$ are the $\frac{58}{201}$ of $33\frac{1}{2}$ as appeareth.

The

The third part treateth of certaine briefe Rules, called Rules of Practise, with diuers necessary questions: profitable not onely for Marchants, but also for all other Occupiers.

Chap. 1.

SOme there be, which do call these Rules of practise, briefes Rules: for that by them, many questions may be done with quicker expedition, than by the rule of Thrée. There bee others which call them the small Multiplication, for because that the product is alwaies lesse in quantitie, than the Number that is to bee multiplied. This practise commeth not in vse, but onely among small kinds of Numbers, which haue ouer them other numbers that are greater. And this béeing well considered, is no other

ther thing but to conuert lesser, and particular kindes of number, into greater: the which may be done by ÿ meanes of diuision, in taking ÿ halfe, the third, the fourth, the fift, or such other parts of the summe, which is to be multiplyed, as the multiplyer is part of his greater kinde, and that which commeth thereof, is worth as much (not in quantitie, but in his owne forme and qualitie) as if you did multiplie simplie the two summes the one by the other. And for the better understanding of such conuersions you must haue respect to one of these two considerations: the first is, when one would demaund this question. At 6 d. the yard of Cotton, what are 18 yards worth by the price? It is manifest that they are worth 18 péeces of 6 pence the péece, or 18 halfe shillings, which must bee turned into shillings, in taking the halfe of 18 s. and they make 9 s: Or otherwise you must consider that at 1 s. the yard, the 18 yards are worth 18 s. Therefore

at

at 6 d. they shall be but halfe so much; for 6 d. is but the $\frac{1}{2}$ of 1 s. Therfore you must take the $\frac{1}{2}$ of 18 shillings, and they make 9 s. which are worth as much as 108 d. that is to say, as 18 times 6 pence.

Rule. First, if you will multiplie any nūber after this manner by pence, wherof the Number of the same pence doe not extend vnto 12, and thereof to bring shillings into the product: you must know the aliquot partes of 12, which are these: that is to say, 6, 4, 3, 2, and 1. For 6 is the $\frac{1}{2}$ of 12, and 4 is the $\frac{1}{3}$ of 12, 3 is the $\frac{1}{4}$, 2 is the $\frac{1}{6}$, and 1 is $\frac{1}{12}$. Then for 6 d. which is the halfe of 1 shilling, you must take the $\frac{1}{2}$ of all the number which is to be multiplied: And that which commeth thereof shal be shillings: if there doe remaine 1, it is 6 d.

An aliquot part is an euen part of a shilling or a pound or of any other thing, as $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{5}$ &c. are called aliquot parts.

For foure pence, you must take the $\frac{1}{3}$ of all the number that is to bee multiplied: & if any vnities doe remaine, they shall bee thirds of a shilling, euery one being in value 4 d.

For

For 3 pence you must take the $\frac{1}{4}$ of all the sum: if any unities do remaine they shall be fourths of a shilling, every one being worth 3 pence.

For 2 pence you must take the $\frac{1}{6}$ of all the sum, and if any unities do remain, they shall be six parts of a shilling, being every one of them worth 2 pence.

For 1 d. take the $\frac{1}{12}$ of the whole sum, if any unities doe remaine, they are the twelueth parts of a Shilling, each of them béeing in value 1 d. as by these examples following doth plainly appeare.

Example. j.

At 6 Pence the yard.
What are 59 yards worth?

---

29 shil. 6 Pence.

ij.

At 4 Pence the yard.
What are 82 yards?

---

27 shil. 4 Pence.

iij.

At 3 Pence the yard.
What 97 yardes?

---

24 *shil.* 3. *Pence.*

iiij.

At 2 Pence the yard.
What 364 yardes?

---

57 *shil.* 8. *Pence.*

v.

At 1 Penie the yard.
What 343. yardes?

---

28 *shil.* 7. *Pence.*

Heere you may see in the first example, that 59 yardes, at 6 pence the yard, are worth 29 shillings 6 pence, in taking the $\frac{1}{2}$ of 59. And in the second example, the 82 yardes at 4 d. the yard, are worth 27 s. 4 d. in taking the $\frac{1}{3}$ of 82. Like-

Likewise, in the third example 97 Yardes, at 3 pence the yard bringeth 24 shillinges 3 pence, in taking the $\frac{1}{4}$ of 97. Also in the fourth example 346 Yardes, at 2 pence the Yard, maketh 57 Shillings 8 pence, in taking the $\frac{1}{6}$ of 346. And finally in the fift example: 343 yardes, at 1 d. the yard, amount to 28 shill. 7 d. in taking the $\frac{1}{12}$ of 343. And so is to bee done of all such like, when the nūber of the pence is any of the aliquot parts of 12.

But if the number of the pence be not an aliquot part of 12: you must reduce them into some aliquot parts of 12: and after the aforesaid maner, you shall make of them two or three products as need shall require, and adde them together into one summe, at 5 d. may be reduced into 4 d. & 1 d. or else into 3, and 2 d. For 4 d & 1 d. do make 5 d. & so do 3 d. & 2 d. the like. Wherefore if you will worke by 4, & by 1: you must for 4 d. take the first $\frac{1}{3}$ of the number that is to be multiplied, and for 1 d. take the $\frac{1}{12}$ of the whole *Rule 2.*

summe or rather for 1 d. ye may take the $\frac{1}{4}$ of the product which did come of the 4 d. because that 1 d is the $\frac{1}{4}$ of 4 d. But if you will worke by 3 d. and 2 pence, you shall take for 3 d. the $\frac{1}{4}$ of the number which is to be multiplied: & likewise for 2 pence the $\frac{1}{8}$ of ẏ same number, adding together both the products: The totall Sum of those numbers shall be the solution to the question. And in like manner is to bée done of all others.

As by these examples following may appeare.

Example.

j.

At 5 pence the yard.
What will 49 yards amount vnto?

16 *s.* 4 *d.*
4 *s.* 1 *d.*
20 *s.* 5 *d.*

ij.

At 7 d. the lib.
What will 54 lib. cost?

18 shil. 0 d.
13 shil. 6 d.

31 shil. 6 d.

iij.

At 8 d. the peece.
What are 40 worth?

13 shil. 4 d.
13 shil. 4 d.

26 shil. 8 d.

Other waies.

What are 40 peeces worth?
At 8 d. the peece.

20 shil.
6 shil. 8 d.

26 shil. 8 d.

iiij.

At 9 pence the yard.
What are 73 yards?

36 shil. 6 d.
18 shil. 3 d.

54 shil. 9 d.

v.

At 10 d. the elle.
What are 32 elles?

16 shil. 0.
10 shil. 8.

26 shil. 8 d.

vj.

At 11 d. the Lib.
What are 27 Lib?

9 shil. 0.
9 shil. 0.
6 shil. 9.

24 Shil. 9 d

Here in this first example, where it is demaunded (at 5 pence the yard) what will 49 yardes amount unto? First for 4 pence, I take the $\frac{1}{3}$ of 49 s. and thereof commeth 16 s. 4 d. then for 1 d. I take the $\frac{1}{4}$ of the same product, that is to say, of 16 s. 4 d. and that bringeth 4 s. 1 d. these two sums added together do make 20 s 5 d. And so much are the 49 yards worth, at 5. the yard.

For 7 d. take the $\frac{1}{3}$ and the $\frac{1}{4}$ of the whole sum which is to be multiplied, and adde them together, that is to say, for 4 d. you must take $\frac{1}{3}$: and for 3 d. the $\frac{1}{4}$: because 4 d. is the $\frac{1}{3}$ of 12 d. and 3 d. is the $\frac{1}{4}$, as in the second example before doth appeare, where the question is thus, at 7 d the Li. what will 54 Li. cost? First for 4 d. I take the $\frac{1}{3}$ of 54 and they make 18 s. Likewise for 3 d. I take $\frac{1}{4}$ of 54, and they are 13 s 6 d. Then I adde 18 s. and 13 s. 6 d. together, so both amount to 31 s. 6 d. and so much are the 54 Li. at 7. d the Li.

Otherwise, for 7 d you shall take

first the $\frac{1}{2}$ of the whole summe for 6 d. Then for 1 d. you must take the $\frac{1}{6}$ of ỹ same product, and adde them together, so you shall haue the like Summe as before.

For 8 pence, you must first take $\frac{1}{3}$ of the whole summe for 4 pence: and another $\frac{1}{3}$ for other 4 d. and adde them together, as in this example doth euidently appeare. Where the question is thus, at 8 d. the péece, what are 40 péeces worth? First for 4 d. I take the $\frac{1}{3}$ of 40 which is 13 s. 4 d. Againe, I take another $\frac{1}{3}$ for the other 4 pence which is also 13 s. and 4 pence. These two summes being added together, do make 26 shillinges, 8 d. and so much are the 40 péeces worth, at 8 d the péece as in the third example aboue said doth appeare.

Otherwise for 8 pence, you may take first the $\frac{1}{2}$ of the whole Summe for 6 d. Then for 2 d. you shal take the $\frac{1}{3}$ of the product, which did come of the said $\frac{1}{2}$ and adde them together: so shalt you haue likewise the solution to the question.

question. As in the same third example of 40 yardes: I take first the $\frac{1}{2}$ of 40 for 6 d. and thereof commeth 20 s. then for 2 d. I take $\frac{1}{3}$ of the said product that is to say of 20 s. which bringeth 6 s. 8 d. these two summes (20 s. and 6 s. 8 d) I adde together, and they make 26 s. 8 d. as before.

For 9 d. you must take the $\frac{1}{2}$ and the $\frac{1}{4}$ of the whole Summe, and add them together: or else for 6 d. take first $\frac{1}{2}$ of the whole Summe, then for 3 d. take the $\frac{1}{2}$ of the same product, because 3 d. is the halfe of 6 d. And 6 d. added with 3 d. bringeth 9 d. as by the fourth example where it is demanded after this sort, at 9 pence the yard, what are 73 yardes worth? First for 6 d I take the $\frac{1}{2}$ of 73? and thereof commeth 36 s. 6 d. then for 3 d. I take the $\frac{1}{2}$ of the same 36 s. 6 d. which is 18 s 3 d. these two summes I add together, and they make 54 s. 9 d. as in the said fourth example is euident.

For 10 d. take first the $\frac{1}{2}$ then the $\frac{1}{3}$ of the whole summe: and adde them

together and it is done.

For 11 d. take first $\frac{1}{3}$ for 4 d. secondly, another $\frac{1}{3}$ for other 4 d. and thirdly $\frac{1}{4}$ for 3 d. (of all the whole summe) and ad them together, and that answereth the question.

Or else for 11 d. take first the $\frac{1}{2}$ for 6 d. Then the $\frac{1}{3}$ of the whole summe for 4 d. and finally the $\frac{1}{4}$ of the last product for 1 d. adding them together, and it will be like to the other.

Rule 3. Likewise by the same reason, when you will multiplie (by shillings) any Number that is under 20 s. you shall have in the product Poundes, if you know the aliquot parts of 20, which are these: 10, 5, 4, 2, and 1. For 10 is the $\frac{1}{2}$ of 20, 5 is the $\frac{1}{4}$ part, 4 is the $\frac{1}{5}$, 2 is the $\frac{1}{10}$ and 1 is the $\frac{1}{20}$.

Then for 10 s. which is the $\frac{1}{2}$ of a pound, you must take the $\frac{1}{2}$ of that number which is to be multiplied, and you shall have pounds in the product. If there doe remaine 1, it shall be worth 10 shillings.

For

For 5 shillinges, you must take the $\frac{1}{4}$ of the number which is to bee multiplied, and if there doe remaine any vnities, they shall be fourth parts of a pound, euery vnitie beeing in value 5 shillings.

For 4 s. you must take the $\frac{1}{5}$ of the Number which is to bée multiplyed: And if there do remaine any vnities, they shall be fift parts of a pound, euery vnity being worth 4 s.

Example.

At 10 *shil. the peece.*
What are 75 *peeces worth?*

36 *lib.* 10 *shil.*

At 5 *shil. the yard.*
What are 89 *yards worth?*

22 *lib.* 5 *shil.*

At 4 *shil. the elle.*
What are 93 *elles worth?*

18 *lib.* 12 *shil.*

For

For 2 shillings, you must take the $\frac{1}{10}$ of the number that is to bee multiplied. Wherfore if you will take the $\frac{1}{10}$ of any number: you must separate the last figure of the same number, (which is neerest your right hand) from al the other figures, with a smal strike or dash with a pen. For all the other figures which doe remaine towardes your left hand from the same figure that you doe separate, shall be the said $\frac{1}{10}$ of a pound: and that figure so separated toward your right hand, shal be so many peeces of 2 shillings the peece, the which figure must bee doubled to to make thereof shillings, as by examples appeareth.

At 2 shil. the lib.
What are 9 | 8 *lib. worth?*

---

9 *lib.* 16 *shil.*

At 2 shil. the dozen.
What are 40 | 3 *dozens worth?*

---

40 *lib.* 6 *shil.*

Heere

Héereupon dependeth another exact way for to multiply by Shillinges (if the number of shillings bee euen) which is thus : you shall take ½ the number of the same shillings, and conuert them into péeces of 2 Shillings. Then by the number of this halfe, you must first multiply the last figure (toward your right hand) of the number which is to be multiplied. And if there bee any Tennes in the same product, those must you reserue in your mind: But if (with the same, or else without the same) you doe finde any diget number the same diget number shall you double, & put it into ẏ place of shil. Then you must procéed to the multiplication of ẏ other figures, adding vnto the product, the tens which you before reserued: & therof shall come pounds. Rule 4

Now for your better vnderstanding of this which hath béene said, and by the way of example, I will propone vnto you this question.

At 8 shillings the grosse, what are 97 grosse worth after the rate?

First

First in this example I take halfe the nũber of shillings, as before is taught that is to say, of 8 s̃. which is 4 s̃: this 4 s̃ I put apart behind a crooked line, right against 97 toward the left hand, as heere you may see, and as heereafter appeareth by diuers examples.

At 8 shil. the grosse.

4) *What will* 9|7 *grosse cost?*

---

38 *lib.* 16 *shil.*

At 6 shil. the yard.

3) *What* 9|9?

---

29 *lib.* 14 *shil.*

At 12 shil.

6 *What* 34|5?

---

207 *lib.* 0 *shil.*

At 14 shil.

7) *What* 21.|0?

---

147 *lib.* 0.

Now

Now in ÿ first example, where it is demanded at 8 s̄. the grosse, what are 97 grosse? First the ½ of 8 s̄. which is 4 s̄. being set a part behind the crooked line, as before is said: then I multiply the 97 by 4, saying first, 4 times 7, is 27. I double the diget number 8, and that maketh 16, the which 16, I do put vnder the line, in the place of shillings, and I keepe the 2 tennes in my minde, which heere in worke doe represent 2 li. Then secondly I multiply 9 by the said 4, and thereof commeth 36 whereunto I adde the 2 li. which before I did reserue, and they make 38. Therefore I put 38 vnder the line in the place of Pounds, and the whole Summe will be 38 li. 16 s. Thus much are the 97 grosse worth, at 8 shillings the grosse: the like is to bée done of all other. As of 12 shil. in multiplying by 6. Likewise of 6 shil. if you multiply by 3; also of 14, if you multiply by 7. And so of all euen numbers after the same manner.

For 1 shilling you must take the ½ of

of the $\frac{1}{20}$ part of any number that is to be multiplied.

And if any thing doth remaine they are shill. Thus by this manner shil. are conuerted into Pounds: for it is euen like as though you did diuide them by 20 shil. as by this Example in the margent doth appeare. Wherere it is demanded at 1 s the yard, the péece or any other thing, what are 350 yards or péeces worth.

At	1 *shil.*
What	350.
17 *lib.*	10 *shil.*

First I separate the last figure of 350 next to my right hand, which is the 0, with a line betwéene it and the figure 5. Then I make a line vnder the 35|0, and I take the $\frac{1}{2}$ of 35, after this maner: saying the $\frac{1}{2}$ of 3 is 1, and 1 remayneth, which remaine signifieth 10, in that second place: Then I put 1 vnder the line against 3, & I procéed to the rest, saying the halfe of 15 is 7 (the which 15 came of the 1 that remained, and of the 5 in the first place.) I put 7 vnder the line, right against

5, and

5, and they make 17 li. The 1 which did last remaine, is 10 s. Now I put 10 s. apart vnder the line, and the whole summe is 17 li. 10 s. so much are 350 worth at 1 s. the péece.

But when the number of shillings is not some aliquot part of 20 shil. you must then conuert the same Number of shillinges, into the aliquot parts of 20, and make two or thrée products as néede shall require, the which must be added together after this manner following.

For 3 shillings, you must first take for 2 shil. the $\frac{1}{10}$ of the Number that is to bee multiplied, then for 1 shilling, you must take the $\frac{1}{2}$ of the product which did come of the the same $\frac{1}{10}$ part: and adde these two Summes together as appeareth by this example following.

At 3 s. the péece of any thing, what shall 684 péeces cost me after the rate? First, for 2 shillings I take the $\frac{1}{10}$ of

684

684, which in 68, in separating the last figure 4, which I must double and they be 8: I set 8 s. apart from the place of Poundes, and then I haue 68 poundes 8 s. for that $\frac{1}{10}$ part that is to say, for the 2 s. secondly, for 1 s. I take the $\frac{1}{2}$ of the product, that is to say: of 68 li. 8 s. which is 34 li. 4 s. and I put the same vnder the 68 li. 8 shillings. Then finally, I adde those two summes together, that is to say 68 li. 8 s. and 34 li. 4 s. so they make 102 li. 12 s. and so much are the 684 péeces at 3 s. the péece, as may appeare in the margent aboue.

At 3 *s.*
What 68 | 4?

68 *lib.* 8 *s.*
34 *lib.* 4 *s.*
102 *lib.* 12 *s.*

For 6 shil. take $\frac{3}{10}$ of the Number which is to bee multiplied: that is to say, take first $\frac{1}{10}$ then double ẏ product of the same $\frac{1}{10}$ and adde them together. Or otherwise for 4 s. take first the $\frac{1}{5}$ of the Number that is to be multiplied, then for 2 s. take $\frac{1}{2}$ of the product, and adde

adde them together.

Or else take for 5 shil. the $\frac{1}{4}$ of the whole summe, then for 1 shil. take the $\frac{1}{5}$ of the product, and adde them together.

Likewise for 7 shil. take first for 5 shil. the $\frac{1}{4}$ then for 2 shil. take the $\frac{1}{10}$ of the number which is to be multiplied, and adde them together.

For 8 s. take the $\frac{1}{5}$ at two sundry times, that is to say, first $\frac{1}{5}$ for 4 s. and then as much more for other 4 s. and adde them together.

For 9 s. take first the $\frac{1}{4}$ and likewise the $\frac{1}{5}$ of the number that is to be multiplyed, and adde them together.

For 11 shil. take first the $\frac{1}{2}$ for 10 s. Then for 1 shil. take the $\frac{1}{10}$ of the product, and ad them together, or else for 5 s. take the $\frac{1}{4}$: then for 4 s. take the $\frac{1}{5}$ & lastly for 2 s take the $\frac{1}{2}$ of the last product, and adde them together.

For 12 shil. take first the $\frac{1}{2}$ for 10 s then for 2 s. take the $\frac{1}{5}$ part of the product, and adde them together.

For 13 s. take the $\frac{1}{4}$ then the $\frac{1}{5}$ and again

gaine another $\frac{1}{5}$ of the Number whic is to bee multiplyed, and adde the products together, that is to say: first for 5 shillings, take the $\frac{1}{4}$: then for 4 s take the $\frac{1}{5}$. And againe another $\frac{1}{5}$ for the other 4 s. and add the three products together. the like is to bee done in all others, when the price of the thing which is valued, is onely of shillings, as by these examples following doth plainly appeare.

At 6 shil.

What 67 ?

13 *lib.*	8 *shil.*
6	14
20 *lib.*	2 *shil.*

At 7 shil.

What 347 ?

86	15
34	14
121 *lib.*	9 *shil.*

At 8 shill.
What 540?

108 li. 0 shil.
108 0

216 li. 0 shil.

At 9 Shil.
What 230?

57 10
46 00

103 lib. 10 Shil.

At 11 Shil.
What 159?

79 10
7 19

87. Lib. 9 Shil.

At 12 Shil.
What 349?

174 10
34 18

209 Lib. 8 Shil.

At 13 *shil.*
What 267?

66.	15.
53.	8.
53.	8.

173 *lib.* 11. *shil.*

Likewise in multiplying by pence, you shall haue (at the first instant) Poundes in the product, in case you know the aliquot partes of the $\frac{1}{10}$ of a pound, or of 24 pence, which are these 12, 8, 6, 4, 3, and 2. For 12, is the $\frac{1}{2}$ of 24, 8 is the $\frac{1}{3}$: 6 is the $\frac{1}{4}$: 4 is the $\frac{1}{6}$: 3 is the $\frac{1}{8}$: and 2 is the $\frac{1}{12}$: and for 12 d. which is 1 s. I haue before made mention thereof.

For 8 d. you must take the $\frac{1}{3}$ of the $\frac{1}{10}$ and the rest which are the peeces of 8 d. must be doubled to make of them peeces of 4 d. And of the same number beeing doubled, you must take the $\frac{1}{3}$ which will be shillings, and if there do yet remaine any thing, they are thirds of a shilling, being in value 4 pence the peece.

For

For 6 d. take the $\frac{1}{2}$ and the $\frac{1}{10}$ and of that remaineth, you must take the $\frac{1}{3}$ which shall bee shillings: if there doe yet remaine 1, it shall bee in value 6 pence.

For 4 d. you must take the $\frac{1}{2}$ of the $\frac{1}{10}$ and of that which resteth take the $\frac{1}{3}$ to make thereof shillings: if any thing doe yet remaine, they are thirds of a Shilling, béeing in value 4 pence the péece.

For 3 pence take the $\frac{1}{2}$ of the $\frac{1}{10}$ and of that remayneth, take the $\frac{1}{4}$ to make of them Shillings: if any thing doe yet remayne, they are fourths of a Shilling, every one of them béeing worth 3 d.

For 2 d. take the $\frac{1}{2}$ of the $\frac{1}{10}$ and of that which resteth, take $\frac{1}{6}$ the which are shillings, if there doe still remaine any thing, they shall be sixt parts of a shil. every one being in value 2 pence.

For 1 d. you shall understand that it is not possible with ease to bring of d. Pounds (into the product) upon the totall sum: But first you must bring

them into shill. by the order of the second Rule of this Chapter, and then afterward you shall conuert them into pounds, if need so require, as by these examples following may appeare.

At 8 d.

What 59 | 6?

19 Lib. 17 Shil. 4 d.

At 6 d.

What 67 | 8?

16 Lib. 19 Shil.

At 4 d.

What 93 | 4?

15 Lib. 11 Shil. 4 d.

At 3 d.

What 57 | 1?

7 Lib. 2 Shill. 9 d.

At 2 d.

What 36 | 4?

3 Lib. 0 Shil. 8 d.

At 1 *d.*
What 67 | 6?

5 *lib.* 12. *shil.* 8 *d.*

2 *Lib.* 16 *Shil.* 4 *d.*

But if the number of pence, be not an aliquot part of 24 pence: Then must you bring them into the aliquot parts of 24, and make thereof divers products, which must bee added together, as shall heereafter appeare.

For 5 pence, you shall first take the 3 pence, then for 2 pence, and add them together, according to the instruction of the last Rule. Or else first take for 4 pence, and then for 1 d.

For 7 d. first take for 4 d. then for 3 d. and adde them together.

For 9 d. take first the 6 d. then for 3 d. adding them together.

For 10 d. take first for 6 d. then for 4 d. and adde them together.

For 11 d. take first for 8 d. then for 3 d. and ad them together: as by these examples following doth appeare.

At 5 d.
What 92 | 7?

11	11	9
7	14	6

19 lib. 6 shil. 3 d.

At 7 d.
What 51 | 2?

8	10	0
6	8	0

14 lib. 18 shil. 8 d.

At 9 d.
What 54 | 6?

13	13	0
6	16	6

20 lib. 9 shil. 6 d.

At 10 d.
What 27 | 3?

6	16	6
4	11	0

11 lib. 6 shil. 3 d.

At

At 11 *d.*

What 26 | 4 ?

8	16	0
3	6	0
12 *lib.*	2 *shil.*	3 *d.*

If you will multiply any number by Shillings, and pence beeing both together, you must take first for the s̃ according to the instruction of the third rule of this first chapter, then take for the pence after the order of the 5 rule before mentioned: but if there bée any aliquot partes of 1 Li. containing both Shillinges and Pence, then for those partes you shall take such like part of the Number that is to bee multiplied as the number is part of 1 Li. the which aliquot parts are these, 6 s̃. 8 d. 3 s̃. d. 2 s̃. 6 d: and 1 s̃. 8 d. For 6 s̃. 8 d. is the $\frac{1}{3}$ of a Li. 3 s̃. 4 d. is the $\frac{1}{6}$ of a Li. 2 s̃. 6 d. is the $\frac{1}{8}$: and 1 s̃. 8 d. is the $\frac{1}{12}$ of a Li. or of 20 s̃. And therfore for 6 s̃. 8 d. you must take the $\frac{1}{3}$ of the number that is to bee multiplied: and if any thing doe remayne, they are thirds *Rule 6.*

of a

of a li. euery one being worth 6 s. 8 pence.

For 3 s. 4 d. you must take the $\frac{1}{6}$ of the number which is to be multiplied, and if any thing doe remaine, they are sixt parts of a li. euery one being in value 3 s. 4 d.

For 2 s. 6 d. you must take the $\frac{1}{8}$ if any thing be remaining they are 8 part of a li. each one béeing worth 2 shil. 6 pence.

For 1 s. 8 d. you shall take the $\frac{1}{12}$ the number that is to bee multiplyed, and if there doe any thing remayne they are Twelue parts of a pound, euery one béeing in value 1 Shilling 8 pence.

At 6 shil. 8 d.
What 647?

---

215 lib. 13 shil. 4 d.

At 3 shil. 4 d.
What 220?

---

36 lib. 13 shil. 4 d.

At 2 Shil. 6 d.
What 47?

5 Lib. 17 Shil. 6 d.

At 1 Shil. 8 d.
What 400?

33 Lib. 6 Shil. 8 d.

Heere shall you accustome your selfe to multiply by all sorts of Summes, being composed of shillings, and pence which may come in vse or practise. As thus, for 1 s. 1 d. for 1 s 2 d. 1 s 3 d. for 1 s. 4 d: Likewise for 2 s. 1 d. 2 s. 2 d. 2 s. 3 d. 2 s 4 d. And so of all other considering moreouer, many subtile abbreuiations, which happen often-times, that are easie to be conceiued. As thus 11 s. 3 d. after that I haue taken first the $\frac{1}{2}$ for 10 s. Then for 1 s. 3 d. I take the $\frac{1}{8}$ of the product, because 1 s. 3 d. is the $\frac{1}{8}$ of 10 s. in taking the sayd $\frac{1}{8}$ of the product. And by this meanes when yee haue taken one product, ye may oftentimes vpon ẏ same take another more briefely than vpon the Rule 7.

upon the sum that is to be multiplied, which thing you must foresee.

At 11 *shil.* 3 *d.*
What 53?

26	10	0
3	6	3

29 *lib.* 16 *shil.* 3 *d.*

At 6 *shil.* 3 *d.*
What 58?

14	10	0
3	12	6

18 *lib.* 2 *shil.* 6 *d.*

At 12 *shil.* 8 *d.*
What 64?

32	0	0
6	8	0
2	2	8

40 *lib.* 10 *shil.* 8 *d.*

But if you will multiply by pounds, shillings, and pence, being altogether: First you must wholy multiply by pounds

pounds. Then take for the shillings, and pence, as in the 6 rule of this chapter is playnely declared. And as by examples following may appeare.

At 3 lib. 6 shil. 8 d.
What 49?

147.	0.	0.
16.	6.	8.
163 lib.	6 shil.	8 d.

At 5 lib. 18. shil. 4 d.
What 543?

2715.	0.	0.
271.	10.	0.
135.	15.	0.
90.	10.	0.
3212 lib.	15 shil.	0 d.

At 2 lib. 7 shil. 4 d.
What 927?

1854	0	0
185	8	0
154	10	0
2193 lib.	18 shil.	0 d.

So these rules doe serue both to buy
Rule 9. and sell. As at such a price the ell, the yard, the peece; the pound waight, or any other thing: how much is such a thing, or so many elles worth? Likewise they are very necessary to couert all peeces of gold & siluer into pounds: for I may aswell say, at 4 s. 8 d. the french crowne, what are 135 crownes worth? as to say at 4 s 8 d. the yard of cloth, what are 135 yards worth?

When any one of the sums which
Rule 10 is to be multiplied, is composed of many denominations: and the other being of one figure alone: then shall ye multiplie all the denominations of the other summe by the same one figure, beginning first with that Sum which is least in value towardes your right hand, and bring the product of those pence into shillings, and the product of the shillings into pounds, as by this example doth appeare.

At 3 lib. 9 shil. 8 d. the peece.

What 7?

24 lib. 7 shil. 8 d.

But

But (if any of the numbers which are to be multiplied) there be with it a broken number, you must (according to his denominator) take one or many parts of the other number, as néed doth require, & set the number which commeth thereof, under the products adding the same together. As thus: At 5 Li. 7 S. 8 d. the grosse, what shal 34 grosse $\frac{1}{5}$ cost? First you shal multiply 5 Li. 7 S. 8 pence, by 34 grosse saying, 5 times 34 doe make 170 Li. Then for 6 S. 8 d. take the $\frac{1}{3}$ of 34, which is 11 Li. 6 S. 8 d. Thirdly for 1 S. take 34 shill. which is 1 Li. 14 S.

At 5 lib. 7 shil. 8 d.
What 34 $\frac{1}{5}$?

170 *lib.*	0 *shil.*	0 *d.*
11	6	8
1	14	0
2	13	10
185 *lib.*	15 *shil.*	6 *d.*

Finally for the $\frac{1}{5}$ grosse, you must take $\frac{1}{5}$ of the 5 Li. 7 S. 8 d. which is 2 L. 13 s 10 d. And then adde your foure products together, so you shall finde, that the 34 grosse $\frac{1}{5}$ at 5 pound 7 Shillings

8 pence

8 pence the grosse is worth 185 li. 14 s. 6 d. as appeareth in the example aforesayd.

And as in the last example, you did for the ½ grosse, take halfe of the price (that one grosse was worth): & therefore because 1 grosse is worth 5 pound 7 shillings 8 pence, the ½ grosse must be worth halfe so much. So likewise if you haue ⅓ of a grosse, or of any other thing, you must take the ⅓ of the price, that one grosse is worth. And in like manner for the ¼ of any thing, you shall take the ¼ of the price, also if you haue ⅕ take the ⅕ of the price that one is worth, and so of all other fractions, as by these examples following doth appeare.

At 4 lib. 6 shil. 8 d.

What 46 ½ ?

184	0	0
15	6	8
2	3	4

201 *lib.* 10 *shil.* 0 *d.*

At

At 8 *lib.* 0 *shil.* 9 *d.*
What 54 $\frac{1}{3}$?

432	0	0
1	7	0
0	13	6
2	13	7

436 *lib.* 14 *shil.* 1 *d.*

At 3 *lib.* 16. *shil.* 8 *d.*
What 17 $\frac{3}{4}$?

51.	0.	0.
8	10	0
5	13	4
1	18	4
0	19	2

68 *lib.* 00 *shil.* 10 *d.*

12 If you will make the proofe of these Rules aforesayd, you must first abate the sum of mony (which the fraction of the multiplication doth import) from the totall summe. And divide the rest of the Pounds of the said totall Summe, by the whole multiplicand, the fraction onely excepted. And

if any thing doe remaine after the diuision is made, that remaine shall bee multiplied by 20: and unto the product of that multiplication, you shall ad the shillings which remained of the rest of the totall sum. Againe, if any thing doe remaine after the same diuision, you must multiply the same by 12, and unto the product ad the pence of the totall summe that remained, if any be left. And thus if ye haue truly wrought, you shall finde againe the higher sum of your question, that is to say, the price that one grosse or any other thing is worth, whereof the question is demanded.

Or otherwise reduce the remaine of the totall summe (the value of the Money that the fraction is worth béeing first reduced) all into Pence, in multiplying the Pounds by 20, and the shillinges by 12: adding therunto, the shillings and pence, which are ioyned with the remaine of the sayd totall summe, if any such bee, then diuide those pence by the aforesaid number

ber that is to be multiplied, the fracti-
ons of the same number beeing also a-
bated. So shall you find the price that
one peece, one grosse, or any other thing
is valued at; As in the first of the 3
last examples going before, where the
totall Sum is 201 Pounds, 10 shill.
from the which I do abate the price of
the halfe grosse which is 2 li. 3 s. 4 d.
the rest is 199 li. 6 s. 8 d. which being
reduced into pence bringeth 47840 d.
I diuide the same by 46, and thereof
cometh 1040 d. Then I diuide that
1040 pence, by 12, and they bring
86 shillings 8 d. that is to say, 4 li.
6 s. 8 pence, which is the price that one
grosse, or any other thing did cost, as
in that first example doth appeare.

The like is to bee done of any man-
ner of thing that is sould by the Hun-
dred, after 5 score to the hundreth. *Rule* 13
As thus: at 12 pound 7 shillings 6 d.
the 100 Pounds waight, what shall
374 pounds waight cost? You shall
first multiply 12 pounds, 7 shillings, 6

pence, by 3: that is to say by thrée hundreth; Then for 50 poūd waight you shall take the ½ of 12 li. 7 s. 6 d. because 50 li. is the ½ of 100 l. Likewise for 20 l. waight which is the ⅕ of 100 li. you shall take ⅕ of 12 l. 7 s. 6 d. Lastly for 4 li. waight you must take the ⅕ of ÿ last product. This done, you must ad all these products into one summe which will make the Sum of 46 l. 5 s. 7 d. ⅘: as by this exemple above written doth appeare.

At	12 lib.	7 shil.	6 d.
What	3 | 74 [l]		
	37	2	6
	6	3	9
	2	9	6
	0	9	10 ⅘.
	46 lib.	5 shil.	7 d. ⅘.

The prooke is made by reducing the totall sum into pence. And to diuide the product by the number that is to be multiplied, that is to say, by 374; likewise diuide the quotient produced of that first diuision by 12: so shall you finde againe the higher Summe 12 li. 7 s. 6 d. which is the price of a 100 li.

waight

waight, as before.

Also the like may be done of our vsuall waight heere in England (which is 112 li. for euery Hundred Pound waight) in case you know the aliquot parts of a 100, that is to say, of 112 li. waight, which are these, 56 li. 28 li. 14 li. and 7 li. For 56 li. is the $\frac{1}{2}$ of 112: 28 li is the $\frac{1}{4}$ of 112 li. 14 li. is the $\frac{1}{8}$ and 7 li. is the $\frac{1}{16}$.

Therefore for 56 li. take the $\frac{1}{2}$ of the sum of money, that the 112 pound waight is worth.

For 28 li. take the $\frac{1}{4}$ of the Summe of money that the 112 li. is worth.

For 14 li. take the $\frac{1}{8}$ of the sum that the C. is worth.

For 7 li. take the $\frac{1}{16}$ of the Sum of money that the C. is worth.

And thus 3 li. 6 s. 8 d. the hundreth pounds waight, that is to say, the 112 li. what shall 24 hundreth 3 quarters 21 li. waight cost after the rate?

First, you shall multiply 24 hūdreth by 3, which is the 3 li. and therof will come 72 li. then for 6 s. 8 d. which is

the $\frac{1}{3}$ of 10 s. you shall take the $\frac{1}{3}$ of 24 which is 8 li. for 24 Nobles, maketh 8 li. afterward, for the 3 quarters of ye C. you shall first for the 56 l. take the $\frac{1}{2}$ of 3 l. 6 s. 8 d. because 56 li. is ye $\frac{1}{2}$ of a C. and

At 3 lib.	*6 shil.*	*8 d.*
What 24 C.	*3. qu.*	*21 li.*
72	0	0
8	0	0
1	13	4
	16	8
	8	4
	4	2
83 *lib.*	2 *shil.*	6 *d.*

thereof commeth 1 li. 13 s. 4 d. then for 28 l. (which is the quarter of a C) you shall take the $\frac{1}{4}$ of 3 li. 6 s. 8 d. or else the $\frac{1}{2}$ of the product, which cometh last of 56 li. which is 16 s. 8 d likewise for 14 li. you must take the $\frac{1}{8}$ of 3 li. 6 s. 8 d. which is 8 s. 4 d. or else the $\frac{1}{2}$ of the product that cometh of 28 li. which is all one. Finally for 7 li. take the $\frac{1}{16}$ of 3 l. 6 s. 8 d. or els the $\frac{1}{2}$ of ye last product that cometh of 14 li. and thereof cometh 4 s. 2 d. Then ad all these products together, and the totall Summe wilbe 83 li. 2 s. 6 d. so much are the 24

C. 3

C. 3 quarters, & 21 li. waight worth, after 3 li. 6 s. 8 d. the hundreth, as appeareth in the margent.

The proofe hereof is made, like to the other proofes aforesayd, sauing that where in those proofes you abate the price of the mony, that the fraction was worth, from the totall Sum. Heere in this example (and in such other like) you shall abate the price of the mony, that the od waight amounteth unto (ouer & aboue the iust hundreths) from the said totall Sum: the rest therof shal you conuert into pence diuiding the product of the multiplication by the iust number of the number of the hundreths, so shall you find the pence, that one Hundreth is worth: which you shall bring into Pounds by the order of diuision, and so of al other.

Chap. 2.

Of the Rule of Three composed, the which is distinct into Foure Rules, *each of them differing, the one from the onher.*

THere belongeth to the first and second partes of the Rule of three composed alwaies 5 numbers: whereof (in the first part of the rule of three composed) the second number and the fift, are alwaies of one semblance and like denomination: whose rule is thus. You must multiplie the first number

Rule 1. by the second, and that shall bee your diuisor, then multiply the other three Numbers the one by the other to bee your diuidend.

Example of this first part, if 100 Crownes in 12 Moneths, doe gaine 15 Li. what will 60 Crownes gaine in 8 Moneths? Answer. First multiply 100 Crownes by 12 moneths, & thereof cometh 1200 for your diuisor, then multiply 15 Li. by 60 Crowns, and by 8 moneths, and you shall haue 7200 wherefore diuide 7200 by 1200, and thereof commeth 6 Li. so many Li. wil 60 crownes gaine in 8 moneths: this Question may bee done by the double rule of 3, that is to say, by the rule of 3 at 2 times. But yet this rule of 3 com-

posed

posed is more briefe.

Crowns.	months.	pounds.	crowns.	months.
100	12	15	60	8

x

72|00

xx|00 6 Lib.

2 In the second part of the rule of Three composed, the third Number is like unto the fift, wherof the rule is thus, you must multiply the third nũber by the 4, and the product shall bee your divisor, then multiply the first number by the second, and the product thereof by the fift, the which number shall be your dividend, or number that is to be divided: as by example. *Rule 2.*

When 60 crownes in 8 months doe gaine 6 li. in how many monthes will 100 crownes gaine 15 li? Answer. Multiplie the third Number 6 by the fourth Number 100: and therof commeth 600: which shall bee your divisor, then multiply the first number 60 by the second Number 8, and the product

duct thereof by the fift number 15 and thereof will come 7200: then diuide 7200, by 600, and the quotient will bee 12, in so many monethes will 100 crownes gaine 15 li. This question may likewise be done by the rule of 3 at 2 times.

Crowns.	*months.*	*pounds.*	*crowns.*	*pounds.*
60	8	6	100	15

x
72|00 *moneths.*
66|00 (12

Rule 3. In the third part of the Rule of 3 composed there may be 5 Numbers, or more: & in this rule, the first number and the last are alwaies dissemblant and of vnlike denomination, the one to the other; and the question is from the last number vnto the first, whereof the Rule is thus, you must multiply that number which you would knowe by those numbers which doe giue the value, and diuide ÿ product of the same by the multiplication of the Numbers which

which are already valued, as by example. If 4 deniers Parisis be worth 5 deniers Tournois, and 10 Deniers tournois, bee worth 12 diniers of Savoy, I demaund how many deniers Parisis are 8 deniers of savoy worth? Answe. Multiply 8 deniers of Savoy (which is the number that you would know) by 4 deniers parisis, and by 10 deniers tournois which are the Numbers that giue the value, & they make 320: then multiply 5 den. tournois, by 12 den. of Savoy, which are the numbers already valued, and they make 60 Finally diuide 320 by 60, and you shall find 5 deniers $\frac{1}{3}$ Parisis, so much are the 8 deniers of Savoy worth.

Parisis.	*Tournois.*	*tournois.*	*Savoy.*	*Savoy*
4 *d.*	5 *d.*	10 *d.*	12 *d.*	8 *d.*

$$\frac{32|0 \text{ par.}}{6|0} \left(5\, d.\ \tfrac{1}{3}.\right.$$

In the fourth part of the rule of 3 composed: the first Number and the *Rule 4.*

last

last are alwaies semblant and of one denomination, and the question of this rule, is alwaies from the last number to that last saving one, whereof there is a Rule which is thus. You must multiply that number which you wold

Rule 4. know, by the Numbers that are already valued, and diuide the product of the same, by the multiplication which cometh of the Numbers that giue the value, as by example.

If 4 deniers Parisis, be worth 5 deniers Tournois, and 10 deniers tournois, bee worth 12 deniers of Sauoy: I demaund how many Deniers of sauoy, are 15 deniers of parisis worth? Answer. Multiply 15 Deniers Parisis that you would know, by 5 deniers Tournois, and by 12 Deniers of Sauoy, which are the numbers already valued, and they make 900. Diuide the same by 4 times 10, which are the numbers that doe giue the value, that is to say, by 40, and you shall finde 22 Deniers $\frac{1}{2}$ of Sauoy: so much are the 15 Deniers Parisis worth.

Parisis

Parisis. Tournois. tournis. Sauoy. Parisis
4d. 5d. 10d. 12d. 15d.

12 |
92 c Sauoy.

44 | 0 (12d. $\frac{1}{2}$.

The Third Chapter treateth of questions of the trade of Marchandize, in *which is taught the rule of Three in Fractions, beginning at the 5 Question following.*

If 31 Deuonsh. Dozens, do cost me 100 li. 15 s. what shall 4 Dozens cost after the same rate? Answ. First bring the 100 li. 15 s. all into shillinges, in multiplying the 100 li. by 20, and adding to the product the 15 shill. and thereof commeth 2015 shil. then multiply 2015 by the third number 4, and diuide the product by 31 and the quotient will bee 260 shill. The which diuide againe by 20, and thereof commeth 13 li. And so much are the 4 Dozens worth.

Dozens.

Dozens.	Lib.	shil.	Dozens.
31	100	15	4
	20		

2015
4
8060

x
28
8060 (260
3xxx
33

If 4 Dozens be worth 13 Li. what are 31 Dozens worth by the price? Answ. Multiply 31 by 13, and thereof commeth 403. The which you shall divide by 4, and thereof commeth 100 Li. $\frac{3}{4}$ which $\frac{3}{4}$ are 15 s. and so much are 31 Dozens worth, as before.

Dozens.	lib.	Dozens.
4	13	31

31
13
93
31
403

403
444 (100 Li. $\frac{3}{4}$.

3. If 49 elles be woꝛth 2 li. 4 s̃. 11 d. what are 18 ells woꝛth by the pꝛice? First you muſt bꝛing 2 l. 4 s̃. 11 d. all into pence, by multiplying 2 li. by 20 maketh 40: adde thereto 4 ſhillinges they make 44 s̃. the which multiply by 12 d. and they make 528 d. wherunto add a 11 d. all is 539 d. the which 539 d. muſt bee your ſecond number in the rule of thꝛee, then multiply 539 by the third Number 18, and thereof commeth 9702, diuide the ſame by 49, & you ſhall haue in your quotient 198 d. the which diuide by 12, & you ſhall find 16 s̃. 5 d. ſo much are the 18 elles woꝛth.

Elles.	*lib.*	*ſhil.*	*d.*	*Elles.*
49	2	4	11	18
	20			539
	44			18
	12			4312
	88			539
	441			
	1			
	539			9702

xz	x
427	76
586	198 (16 *shil.* 6 *d.*
9702 (189.	xzx
4999	x
44	

4 If 18 elles bee worth 16 s. 6 d. what are 49 elles worth by the price? Answere. Bring 16 s. 6 d. into pence in multiplying 16 by 12, and thereof commeth 198 d. with the 6 d. added to it, then multiply 198 d. by 49, the product wil be 9702. The which divide by 18 elles, and thereof commeth 539 d. Then divide 539 by 12, and the product thereof by 20: So shall you have 2 li. 4 shill. 11 pence, and so much are the 49 elles worth.

Elles.	*shil.*	*d.*	*Elles.*
18	16	6	49
	12		198
	32		392
	166		441
	198		49
			9702

17	1
446	151
9702 (539	528 (44 shil.
1888	122
11	1

Note that wheras in the first part of this Booke, I haue set forth the rule of three both in whole numbers, and also in fractions: now I will shew you how to doe the said rule of Three, in fractions more at large. And because I would haue you to vnderstand the same generally, you must first cōsider if the three numbers that shal bee proponed (in any question of the said rule of three) be all fractions, yea, or no? which if they bee all 3 numbers fractions, then must you worke as followeth.

First you must Multiplie the Numerators of the second and third fractions in your rule of Three, the one by the other, and againe you must multiply that product, by the denomina-

toꝛ of the first fraction : & the number which cometh of this last multiplicati-on, shall be your diuidend, oꝛ number that must be diuided.

Secondly, you must multiply likewise the Denominatoꝛs of the second and third fractions in your sayd Rule of thꝛée, the one by the other; and the off-come agayne by the Numeratoꝛ of the first fraction. And the nũber which is pꝛoduced of that multiplication, shal be your diuisoꝛ.

Thirdly, you must diuide the afoꝛesayd diuidend by the Diuisoꝛ, and the quotient will bee the answere to the question, as by these examples heere-after appeare.

But if you find whole numbers and fractions together, in the sayd Rule of thrée : you must first reduce the same into their fractions by the 6 reduction.

Likewise if you finde any of the

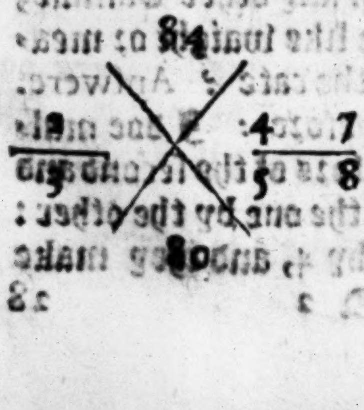
thrée

thrée numbers in your rule of thrée, to be whole numbers, alone without any fraction ioyned with it, you must in this caſe put 1 vnder the ſame whole Number with a line betwéene them both: The which 1 doth repreſent the denominator to the ſame whole number, & then you muſt procéed to worke the Rule of thrée in like manner, as though they were all fractions: as before is ſayd.

The Examples of all three differences aforeſayd, do follow in the three *next queſtions orderly.*

If $\frac{2}{3} \times \frac{4}{5}$ $\frac{7}{8}$: I doe vnderſtand thereby thus as followeth. If $\frac{2}{3}$ of any waight, or meaſure be worth $\frac{4}{5}$ of Twenty s. or of any other Summe, what are $\frac{7}{8}$ of the like waight or meaſure worth after the rate? Anſwere. Firſt as is ſayd before: I doe multiply the numerators of the ſecond and third fractions, the one by the other: that is to ſay, 7 by 4, and they make

28: againe, I doe multiply the ſaid 28 by the Denominator of the firſt fraction, that is to ſay, by 3, and thereof commeth 84 the which 84, I ſet ouer the croſſe for my diuidend. Secondly I doe multiplie the Denominators of the ſecond and third fractions the one by the other: Namely 8 by 5, and they make 40: again I do multiply the ſaid 40 by the numerator of the firſt fraction: that is to ſay, by 2, and thereof commeth 80, the ſame 80 I doe ſet vnder the croſſe for my diuiſor. Then I diuide 84 by 80, and there commeth in the quotient 1 Li. & $\frac{4}{80}$ remaining, the which $\frac{4}{80}$ beeing abbreuied, maketh $\frac{1}{20}$ of a pound, which is worth 12 d. And ſo much will the aforeſaid $\frac{7}{8}$ coſt, as by the worke following, doth appeare.



$$\begin{array}{r} 7 \\ 4 \\ \hline 28 \\ 3 \\ \hline 84 \end{array}$$

8	84
5	80 ($1\frac{4}{}$
40	
2	
80	

6. If $\frac{2}{5}$ of an ell of any marchandize doe cost me 12 shil. 7 d. the which 7 d. doth make $\frac{7}{12}$ what will $\frac{9}{10}$ of an Elle cost me after the same rate? Answe. First, I set downe my numbers as followeth: If $\frac{2}{5}$ ✕ 12 $\frac{7}{12}$ $\frac{9}{10}$. Then by the 6 reduction I reduce 12 $\frac{7}{12}$ all into Twelves, and they make $\frac{151}{12}$ for the second nũber in my rule of three which must stand in the second place of 12 $\frac{7}{12}$ And then will my 3 Numbers stand thus as followeth $\frac{2}{5}$ ✕ $\frac{151}{12}$. $\frac{9}{10}$.
Then I multiply 151 by 9, and the of come by 5, and thereof cometh 9795, the which I doe set over the crosse for my dividend. Likewise I multiply 12 by 10, and the of come by 2, and thereof commeth 240: which I doe set under the crosse for my divisor. Then I divide 6795, by 240: & thereof cometh

in the quotient 28 shillinges, and 75 remaining, the which 75 because it is the remaine of s. I doe multiply it by 12 pence, for that there is 12 pennies in a shil. and thereof cometh 900. The same 900, I diuide againe by 240, and thereof commeth 3 pence, and 180 remayning which 180 I doe set apart ouer 240, with a line betwéen them both and they are $\frac{180}{240}$. The which being abbreuied, doe make $\frac{3}{4}$ of a penny. And thus I find that the $\frac{9}{10}$ of an elle shall cost 28 s. 3 d. $\frac{3}{4}$, as appeareth.

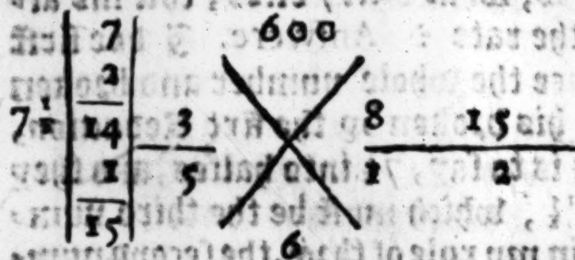
151	12		6795	
	12	$\frac{2}{5}$		$\frac{551}{12}$ $\frac{9}{10}$
7	24			
12	127			
12	151		240	

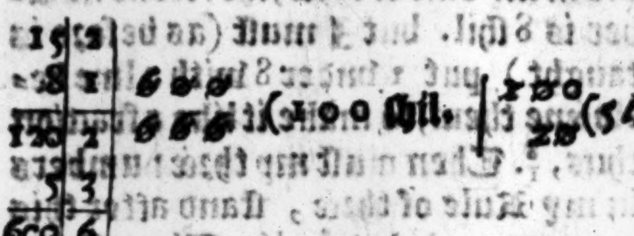
151	12	2 8
9	10	2 8 7
1359	120	6 7 9 5 (28 shil.
5	2	2 4 0 0
6795	240	2 4

```
  75  | 1
  12  | 38
------| 900  (3 li. 180/240
 150  | 240
 75   |      3/4
------|
 900  |
```

7 If $\frac{3}{5}$ of an elle doe cost me 8 Shillinges, what will 7 elles $\frac{1}{2}$ cost me after the rate? Answere. I doe first reduce the whole number and broken into his broken by the first Reduction, that is to say, 7 $\frac{1}{2}$ into halfes, and they are $\frac{15}{2}$, which must be the third number in my rule of three, the second number is 8 shil. but I must (as before is taught) put 1 vnder 8 with a line betweene them, to make it like a fraction thus, $\frac{8}{1}$. Then must my three numbers in my Rule of three, stand after this manner: $\frac{3}{5} \times \frac{8}{1}. \frac{15}{2}$. Then I doe multiply 15 by 8, & the product thereof by 5, amounteth 600: The which I do set ouer the crosse, for my diuidend. Likewise, I doe multiply 2 by 1, and the product thereof by 3, and thereof commeth 6, the which I doe set vnder

the crosse for my diuisor. Then I diuide 600 by 6, and I find in my quotient 100: the which is a 100 shil: I doe therefore diuide 100 by 20 shil. and my quotient is 5 li. And so much will the 7 ells $\frac{1}{2}$ cost me, as héereafter doth appeare.





If 1 yard of Veluet cost 19 Shil. what shall $\frac{3}{4}$ of a yard cost? Answer. Set downe your Numbers thus: If $\frac{1}{1} \times \frac{19}{1}\ \frac{3}{4}$. Then multiply 1 times 19 by 3: and thereof commeth 57 for your

your diuidend, or number to bee diuided. The which 57 you shall diuide by 1 times 1, 4 times, which are 4, and your quotient will be 14 s. $\frac{1}{4}$, which $\frac{1}{4}$ is worth 3 d. so much are the $\frac{3}{4}$ of a yard worth after 19 shill. the yarde, as by practise followeth.

57

$\frac{1}{1}$ $\frac{19}{1}$ $\frac{3}{4}$ | 57 (14 *shil.* $\frac{1}{4}$.

4

Or otherwise by the rules of practise first for $\frac{2}{4}$ of a Yarde which is $\frac{1}{2}$ of a yarde, you must take the $\frac{1}{2}$ of 19 shill. take the $\frac{1}{2}$ of the product, that is to say, of 9 s. 6 d. and therof cometh 4 s. 9 d. ad these numbers together, and you shall haue 14 s. 3 d. as aboue is sayd, and as appeareth here in the margent

19 *shil.*	
9 *shil.*	6 *d.*
4	9
14	3

9 If $\frac{1}{2}$ of a yard of Veluet doe cost 14 s.

14 shil. 3 d. what shall 1 yard cost? Answere. Set your Numbers downe thus: If $\frac{3}{4}$ × 14 $\frac{1}{4}$ $\frac{1}{1}$. Reduce 14 $\frac{1}{4}$ into a fraction, and they will be $\frac{57}{4}$, then multiply 57 by 1, 4 times, and thereof commeth 228 for your diuidend. Likewise multiply 1 times 4, 3 times, and thereof commeth 12 for your diuisor: then diuide 228 by 12, and your quotient will be 19 s. so much is the yard of Veluet worth.

228

$\frac{3}{4}$ × $\frac{57}{14\frac{1}{4}}$ $\frac{1}{1}$ | 228 (19 shil.

12

Or otherwise by the Rule of practise: you shall take the $\frac{1}{3}$ part of 14 shil. 3 d. which is 4 s. 9 d. and adde it with the same 14 s. 3 d. and you shall haue 19 shil. as before.

14 shil.	3 d.
4	9
19 shil.	0 d.

10 If one elle of Holland cloath bee worth 5 s. what are $\frac{2}{3}$ worth after the rate? Ans. Say thus, if $\frac{1}{1} \times \frac{5}{1}. \frac{2}{3}$. Then multiply 2 times 5, one time, & thereof commeth 10 for your diuidend: likewise multiply 3 times 1, one time they make 3 for your diuisor, then diuide 10 by 3, and thereof commeth 3 s. $\frac{1}{3}$ which $\frac{1}{3}$ is worth 4 d. and so much are the $\frac{2}{3}$ of an ell worth.

10

$\frac{1}{1}$ × $\frac{5 \quad 2}{1 \quad 3}$ | $\frac{1}{10}$ (3 shil. $\frac{1}{3}$.

3 | 3,

3

Or otherwise, by the rule of practise: take first the $\frac{1}{3}$ of 5 s. for ỳ $\frac{1}{3}$ of an elle that is 1 s. 8 d. Likewise, for the other

other $\frac{1}{3}$ of an elle, take againe another $\frac{1}{3}$ of 5 s. which is also 1 shill. 8 d. & ad them together, and so shall you haue 3 s. 4 d. as before.

5 *shil.*

1	8
1	8

3 *shil.* 4 *d.*

11 If $\frac{2}{3}$ of an elle of Holland cloth doe cost me 3 s. 4 d. what shall 1 elle cost? Answ. Set downe your numbers thus: if $\frac{2}{3}$ — $3\frac{1}{3}$ — 1. First reduce $3\frac{1}{3}$ all into thirdes, and it will bee $\frac{10}{3}$. Then multiplie 1 times 10, 3 times, and thereof commeth 30 for your diuidend. Likewise multiply 1 times 3, 2 times, and your diuisor will bee 6, then diuide 30 by 6, and you shall haue 5 shil. so much is the elle of Holland cloth worth.

30

2 — 10 — 1 — 30 — 5 *shil.*

3 — $3\frac{1}{3}$ — 1 — 6

6

Or otherwise by practise, take the $\frac{1}{2}$ of 3 s. 4 d. which is 1 shilling 8 pence & adde it to the same 3 shillings, 4 d. and thereof will come 5 s. as before. For the $\frac{1}{3}$ of 5 s. is as much as the $\frac{1}{2}$ of 3 s. 4 d. which was the price of the $\frac{2}{3}$ of an elle did cost, as appeareth

3 *shil.*	4 *d.*
1	8
5 *shil.*	0 *d.*

12 If one ell cost me 17 s. what shal 15 ells $\frac{1}{8}$ part cost? which $\frac{1}{8}$ is halfe a quarter of an elle. Answe. Say if $\frac{1}{1} \times \frac{17}{1}$. 15 $\frac{1}{8}$. First reduce 15 $\frac{1}{8}$ into eight parts, and they make $\frac{121}{8}$ then multiply 121 by 17, 1 time, and thereof commeth 2057, for your Dividend. Likewise multiplie 8 times 1, 1 time, and the product will bee 8, for your divisor, then divide 2057, by 8, and you shall find 257 shil. $\frac{1}{8}$, which is twelue l. 17 s. 1 d. $\frac{1}{2}$ & so much are the 15 elles $\frac{1}{8}$ worth, as by practise doth appeare in the page following.

$$\frac{1}{1} \times \frac{17}{1} \qquad \frac{121}{15\frac{1}{8}}$$

Or otherwise, for 10 s. take the ½ of 15, which is 7 l. 10 s. then for 5 s take the ½ of 7 li. 10 s. which is 3 li. 15 s. Thirdly, for 2 s. take the ⅕ of 7 l. 10 s because the ⅕ of 10 s. is 2 s. Fourthly, for the ⅛ of the elle, you shall take the ⅛ of 17 shill. which is 2 shil. 1 penny: ½ Then adde all these Summes together, and you shall find 12 l. 17 s. 1 peny ½ as before, and as appeareth more plainly in the former practise.

15 ⅛		
17		
7	10	0
3	15	0
1	10	0
	2	1 ½
12 *li.*	17 *shi.*	1 *d* ½.

13 If 25 elles bee worth 2 li. 3 s. 3 d what are 18 ells ¾ worth by the price? Answere. First put 3 s. 4 d. into the part of a li. and you shall haue ⅙: then say if 25 giue me 2 li. ⅙ what shall 18 ¾ giue?

$\frac{3}{4}$ giue : put the whole Numbers 6 into their broke, & then multiply 1 times 13 by 75, and the product will be 975, the which you shall diuide by 25 times 6, 4 times: which maketh 600. Then diuide 975 by 600: and your quotient will be 1 Li. and 375 will remaine, the which 375 you must multiply by 20, & therof will come 7500, diuide the same by 600, your quotient will be 12 s. and 300 will remayne, the which abreuied is $\frac{1}{2}$ which is 6 d: thus the 18 elles $\frac{3}{4}$ are worth 1 L. 12 s. 6 d. as by practise will appeare.

13		75
$2\frac{1}{2}$ × $2\frac{1}{3}$		$18\frac{3}{4}$.

Or otherwise, by the rules of practise, for because that 12 elles $\frac{1}{2}$ is the $\frac{1}{2}$ of 25 elles, therefore take the $\frac{1}{2}$ of 2 Li. 3 s. 4 d. which is 1 L. 1 s. 8 d. then for 6 ells $\frac{1}{4}$ take the $\frac{1}{4}$ of 2 L. 3 s. 4 d. or else the $\frac{1}{2}$ of the last product, (that is to say of 1 L. 1 s. 8 d.) which is all one, and adde them together, so shall you haue 1 Li. 12 s. 6 d. as before.

2 *Lib.*

lib.	shil.	d.
2	3	4
1	1	8
	10	10
1 lib.	12 shil.	6 d.

14 If 15 yards be worth 32 s. what are halfe a yarde and halfe a quarter, or else $\frac{5}{8}$ of a yarde worth? Answere. Say if $\frac{15}{1}$ give $\frac{32}{1}$, what will $\frac{5}{8}$ give? Multiply 1 times 32 by 5, and divide the product by 15 times 8 times, and your quotient wilbe 1: and $\frac{40}{120}$ remaining, which is $\frac{1}{3}$ of a shil. that is to say 4 d. and so much are the $\frac{5}{8}$ of a yarde worth, that is to say 1 s. 4 d.

$\frac{15}{1} \times \frac{32}{1}\ \frac{5}{8}$.

Or otherwise, see what the yard is worth after the maner aforesaid in the other Examples, and you shall finde that the yard is worth 2 shil. 1 d. $\frac{3}{5}$: of the which Number take first the $\frac{1}{2}$ for $\frac{4}{8}$, which is 1 shil. 0 d. $\frac{4}{5}$ of the which Number, take the $\frac{1}{4}$ for the other $\frac{1}{8}$ which

which is 3 d. $\frac{1}{3}$ adde these two Numbers together, and you shall find the $\frac{2}{3}$ to be worth 1 s. 4 d. as before is said.

2 shil.	1 d.	$\frac{2}{3}$
1	0	$\frac{4}{3}$.
	3	$\frac{1}{3}$.
1 shil.	4 d.	0

15 If 13 elles $\frac{5}{6}$ bee worth 27 Shil. what are 10 ells $\frac{2}{3}$ worth by the price? Answere. Say if 13 $\frac{5}{6}$ giue $\frac{27}{1}$, what shall 10 $\frac{2}{3}$ giue? Put the whole numbers into their broken, and you shall finde $\frac{83}{6}$ $\frac{27}{1}$. and $\frac{32}{3}$. Then multiply 6 times 27, by 32 and thereof commeth 5184, the which Number you shal diuide by 83 times 1, 3 times, and you shall finde 20 shil. $\frac{68}{83}$ which fraction is worth 8 d. $\frac{69}{83}$ parts of a penny.

$$\frac{83}{13\frac{5}{6}\ \frac{6}{1}\ \frac{27}{1}} \qquad \frac{32}{10\frac{2}{3}.}$$

16 If 2 yardes $\frac{1}{2}$ be worth 4 s. 8 d. what are 8 yards $\frac{1}{4}$ worth? Answere.

 Put

put the 8 d. into the part of a shilling, setting 8 ouer 12, & it will be $\frac{8}{12}$ which abbreuied are $\frac{2}{3}$ then reduce the whole numbers into their broken, and they will stand thus: $\frac{5}{2}$, $\frac{14}{3}$, $\frac{33}{4}$, then multiply 2 times 14 by 33, and diuide the product by 5 times 3, 4 times: & you shall find 15 s. and $\frac{24}{60}$ will remaine, which are worth 4 d. $\frac{4}{5}$ so much are the eight yards $\frac{8}{4}$ worth.

$$\frac{5}{2\frac{1}{2}} \quad \frac{14}{4\frac{2}{3}} \quad \frac{33}{8\frac{1}{4}}$$

17 If 1 Kersey be worth 2 li. 6 s. 8 d. how many Kerseis shall I buy for 36 li. 3 s. 4 d. after the rule of 3? Answ. Put 6 s. 8 d. into the part of a li. and you shall haue 2 li. $\frac{1}{3}$ for the first number in the rule of 3, and 1 kersey for the second number: then put 3 s. 4 d. into the part of a li. and it is $\frac{1}{6}$, so you shall haue 36 li. $\frac{1}{6}$ for the third number, then will your 3 Numbers in the rule of 3 stand thus: $2\frac{1}{3} \times \frac{1}{1} \cdot 36\frac{1}{6}$. Then reduce the whole Numbers into their

bro-

broken, & it will bee thus, $\frac{7}{3} \times \frac{1}{7}$ $\frac{217}{6}$ Then multiply 3 times 1 by 217, and thereof will come 651 for your Diuidend. Likewise multiply 7 times 1 by 6: and the product thereof will bee 42. Then diuide 651 by 42, and you shall find $15\frac{1}{2}$. So many Kerseis of 2 li. 6 s. 8 d. the peece, shall you haue for 36 li. 3 s. 4 d.

$$\frac{7}{2\frac{2}{3}} \times \frac{1}{1} \qquad \frac{217}{36\frac{1}{6}}$$

Chap. 4.

Of losses and gaines in the trade of *Marchandize.*

1. If 13 yardes $\frac{1}{2}$ be worth 22 pound 10 shil. how shall I sell 1 yard to gaine $\frac{1}{3}$ or to make 3, or 4? which is all one. Answ. Say by the rule of Three, if 3 doe yeeld 4. what will $22\frac{1}{2}$ yeelde? multiplie and diuide, & you shal find 30 Li. Then say againe by the rule of 3, if 13 yardes $\frac{1}{2}$ doe giue 30 Li. as well of principall as of gaine: what will

1 yarde bee worth by the price? Multiplie and diuide, and you shall finde 2 Li. 5 shil. and for that price must the yard be sold to gaine the $\frac{1}{3}$ or to make of 3, 4.

180
45
$\frac{3}{1}$ ✠ $\frac{4}{1}$ $22\frac{1}{2}$
6

180
66) 30

90

40
$13\frac{1}{3}$ ✠ $\frac{30}{1}$ $\frac{2}{1}$
40

Or otherwise, take the $\frac{1}{3}$ part of 22 Li. 10 s̃. which is 7 Li. 10 s̃. that shall you adde with 22 Li. 10 s̃. & you shall haue 30 Li. as before. Then diuide 30 by $13\frac{1}{3}$ and you you shall finde 2 Li. 5 s̃. as aboue is said.

Li.	shil.
22	10
7	10
30	00

2 If one yard be worth 27 s̃. 6 d. for

for how much shall 16 yards $\frac{2}{3}$ bée sold to gaine 2 s. vpon the Li. of Money? that is to say, vpon 20 s? Answ. Ad 2 s. vnto 20, and you shall haue 22, then say: If 20 s. principall doe giue 22 s, principall and gaine: how much will 27 s. 6 d. principall yéeld? Multiplie and diuide, and you shall find 30 s. $\frac{1}{4}$: then say againe by the rule of 3. If 1 yarde doe giue me 30 s. $\frac{1}{4}$ (which is aswell the principall as the gaine) what shall 16 yards $\frac{2}{3}$ giue me? Multiplie and diuide, and you shall finde 25 Li. 4 s. 2 d. For the same price shall the 16 yardes $\frac{2}{3}$ bee sold to gaine after the rate of 2 s. vpon the pound of money, or vpon 20 s. which is all one.

$$\frac{20}{1} \maltese \frac{22}{1} \quad \frac{55}{27\frac{1}{5}} \;\Big|\; \frac{1}{1}. \maltese \overset{121}{30\tfrac{1}{4}} \;\; \overset{50}{16\tfrac{2}{3}}.$$

3 If 10 yardes $\frac{2}{3}$ bée worth 25 L. 10 s. for how much shall 2 yards $\frac{1}{4}$ bee sould to gaine after 10 Li. vppon the 100 Li. of money? Answer. Say if 100 principall yéeld 110, as well principall as

gaine, how much will 25 li. 10 shil. yeeld mee? Multiplie and diuide and you shall find 28 li. 1 s. Then say, if 10 yards $\frac{2}{3}$ doe yeeld mee 28 li. 1 s. as well principall as gaine, how much shall $2\frac{1}{4}$ yeeld me? Multiply and diuide and you shall finde 5 li. 18 s. 4 d. $\frac{1}{15}$ and for so much shall the 2 yardes $\frac{1}{4}$ be sould to gaine after 10 li. vpon the 100 li. of money.

$$\begin{array}{cccc} & & & 51 \\ \hline & \frac{100}{1} & ✠ \; \frac{110}{1}. & 25\frac{1}{2} \\ & 32 & 561 & 9 \\ \hline & 10\frac{2}{3} & ✠ \; 28\frac{1}{20} & 2\frac{1}{4}. \end{array}$$

And although that in these questions of gaine and losse, sometimes the first number is not like vnto the third number, that is to say, of the same denomination: for whereas one would say, if 20 s. gaine 2 s. what shall 50 li. gaine? or what shall 25 li. gaine, &c. Or if 20 li. doe gaine 2 li. what shall 25 shil. gaine? or what shall 27 shil. $\frac{1}{2}$ gaine?

gaine? Yet the same doth not proue that the rule is therefore false. For if 10 s. doe gaine 2 s. 20 l. shall gaine 2 li. and 20 d. shall gaine 2 d. likewise 20 crownes, shall gaine 2 crowns, and so of all other. Therefore it is to be vnderstood, that the first number of the rule of three in these reasons is purposed to be semblable or like to the third in quality or name.

When one Marchant selleth wares to another, and he giueth to the buyer 2 vpon 15: how much shall the buyer gaine vpon the 100 after the rate?

Ans. First adde 2 vnto 15, and they are 17, then say if 15 giue 17 what shall 100 giue? Multiply and diuide & you shall finde 113 $\frac{1}{3}$ so the buyer getteth after the rate of 13 $\frac{1}{3}$ vpon the 100.

15 : | 17 : | 100.

4 If one Northren dozen cost mee 3 l. 5 s. I sel the same again for 3 l. 12 s. 6 d. how much doe I gaine vppon the pound of money after the rate? Answ.

Say if 3 Li. $\frac{1}{4}$ do giue 3 Li. $\frac{5}{8}$ what shall $\frac{20}{1}$ giue? put the whole Number into their broken, & you shall haue $\frac{13}{4}$ + $\frac{29}{8}$ $\frac{20}{1}$ then multiply 4 times 29, by 20: and therof commeth 2320 for your number that is to be diuided, likewise multiply 13 times 8, 1 time: and therof cometh 104. Then diuide 2320, by 104 and you shall find 22 s. $\frac{4}{13}$. So I shall get 2 s. $\frac{4}{13}$ vpon 20 s. or vpon the pound of money.

$$\frac{13}{3\frac{1}{4}} + \frac{29}{3\frac{5}{8}} \quad \frac{20}{1}.$$

5 If a yard of cloth cost me 7 s. 8 d. and afterward I sell of the same cloth 13 yards $\frac{1}{2}$ for 4 Li. 13 s. 4 d. I would know whether I doe win or lose, and how much vpon the 100 Li. of Mony? Answere. See first at 7 s. 8 d. the yard what the 13 yardes $\frac{1}{2}$ shall cost, and you shall find 5 Li. 1 s. 7 d. And I sold the same but for 4 Li. 13 s. 4 d. so that I do lose vpon the 13 yards $\frac{1}{2}$, the sum of 8 s. 3 d. Then if you will know how

much

much is lost in the 100: Say by the rule of three, if 5 li. 1 s. 7 d. do lose 8 s 3 d. what will 100 li. lose? First, put 1 s. 7 d. into the part of a li. and it wil be $\frac{19}{240}$. Likewise put 8 s. 3 d. into the part of a li. & it is $\frac{33}{80}$. Then will your numbers stand thus: 5 $\frac{19}{240}$ ✠ $\frac{33}{80}$, $\frac{100}{1}$ reduce the whole into his broken, and then multiply and diuide, so you shall find 8 li. $\frac{11}{37}$ $\frac{84}{51}$ which fraction is worth 2 shill. 5 d. $\frac{169}{1219}$ and so much is lost in the 100 li. of money.

$$\frac{1219}{5\ \frac{19}{240}\ \maltese\ \frac{33}{80}\quad \frac{100}{1}}$$

6. More, if 12 yards $\frac{1}{2}$ of scarlet, bee sold for 30 li. 15 s. vppon the which is gained after the rate of 11 $\frac{1}{9}$ vppon the 100: I demaunde what the yard did cost at the first? Answere. From 30 li. 15 s. substract his $\frac{1}{10}$ part which is 3 li. 1 s. 6 d. and there resteth 27 li. 13 s. 6 d. the which Number multiplied by 2, bringeth 55 li. 7 s. of the which number take the $\frac{1}{5}$, which is 11 li. 1 s.

and

and 4 d. and $\frac{4}{5}$. Then take againe the $\frac{1}{5}$ of the said 11 Pound, 1 shilling, 4 d. $\frac{4}{5}$ which is 2 l. 4 Shillings 3 Pence $\frac{9}{25}$. And so much did the yarde coste at the first pennie.

30 *lib.*	16 *shil.*	0 *d.*
3	1	6
27	13	6
2	0	0
55	7	0
11	1	4 $\frac{4}{5}$.
2 *lib.*	4 *shil.*	3 *d.* $\frac{9}{25}$.

7 More, if 15 yards $\frac{3}{4}$ of Scarlet, doe cost me 32 l. 14 s. 4 d. And I sell the yarde againe for 2 l. whether doe I winne or lose, and how much in or upon the pound of money.

Answ. Looke what the 15 yardes $\frac{3}{4}$ are worth at 2 li. the yard, and you shall finde that they are worth 31 li. 10 s. But they did cost 32 li. 13 s. 4 d so that there is lost uppon the whole, 1 li. 3 s. 4 d. Then to know how much

much is lost in the li. Say by the rule of thrée, if 32 li. $\frac{2}{3}$ doe lose 1 li. $\frac{1}{6}$, what will $\frac{1}{1}$ lose? that is to say, what will 1 li. lose? reduce the whole numbers into their broken, and then multiplie and diuide, so shall you find $\frac{21}{588}$ part of a li. Then multiply 21 by 240 d. because so many pence are in a pound, & diuide the product by 588, & you shall find 8 d. $\frac{336}{588}$. which being abreuied, do make $\frac{4}{7}$, and thus you sée that 8 d. $\frac{4}{7}$ is lost in the pound of money.

$$\frac{98}{32\frac{2}{3}} \maltese \frac{7}{1\frac{1}{6}} \quad \frac{1}{1}.$$

8. If 1 yarde of cloth of Tissue, be sold for 3 li. 15 s. whereuppon is lost after the rate of 10 l. in the 100: I demaund what 12 yardes $\frac{1}{2}$ of the same Tissue did cost? Answ. Adde vnto 3 li. 15 s. his owne $\frac{1}{10}$ part, which is 7 s. 6 d. and all amounteth to 4 li. 2 s. 6 d. then looke what the 12 yardes $\frac{1}{2}$ will amount vnto, after 4 li. 2 s. 6 d. and you shall find that they will come

to

to 51 l. 11 s. 3 pence, so much did the 12 yards $\frac{1}{2}$ cost.

	12 $\frac{1}{2}$.
3 li. 15 sh. 0 d.	4 li. 2 shi. 6 d.
7 6	48 00 0
4 li. 2 shil. 6 d.	1 10 0
	2 01 3
	51 li. 11 shi. 3 d.

9. More, if I sell one Wilshire white for 6 l. 12 s. whereupon I doe gaine after the rate of 2 s. upon the l. of money: that is to say, uppon 20 s. I demaund what 11 Peeces of the same whites did cost mee? Answer. From 6 l. 12 s. (which is 132 s.) you shall substract his $\frac{1}{11}$ part, that is to say, 12 s. and there will remaine 120 s. or 6 l. Then see at 6 l. the cloth, what the 11 clothes are worth, and you shall finde that they are worth 66 l. And so much did the 11 clothes cost.

132 shil.	11
12 shil.	6
120 shil.	66 l.

10 If I sell 10 ells $\frac{1}{2}$ of Holland for 22 s. 6 d. whereupon I doe lose after the rate of 2 s. in the li. of Money. I demand what the elle did cost mee? Answ. Say by the rule of three, if 18 give 20 s. what will 22 s. 6 d. give? Multiplie and divide, and you shall find 25 s. Then divide 25 s. by 10. $\frac{1}{2}$: and thereof commeth 2 s. 4 d. $\frac{4}{7}$. So much did the elle cost.

$$\frac{18}{1} \times \frac{20}{1}. \qquad 22\frac{1}{2}.$$

11. If I sell one cloth for 5 li. whereupon I doe loose after 10. in the 100. I demaund how much I should loose or gaine, in the 100, if in case I had sold the same for 5 li. 10 s. Answ. Say if 90 yeeld 100, how much will 5 li. give? Multiply and divide & you shall finde 5 li. $\frac{5}{9}$. Then say againe by the rule of Three, if 5 $\frac{5}{9}$ come to 5 $\frac{1}{2}$. what will 100 come to? Multiplie & divide and you shall finde 99 li. which beeing substracted from a 100, there will remaine 1 li. & so much is lost in the 100

Of

Chap. 5.

Of Lengths and breadthes of Tapistry, and other clothes.

1 If a péece of Tapestrie be 5 elles $\frac{3}{4}$ long, and 4 Elles $\frac{2}{3}$ in breadth how many elles square doth the same peece containe? Answere. Multiply the length by the breadth, that is to say 5 $\frac{3}{4}$ by 4 $\frac{2}{3}$ and thereof will come 26 els $\frac{5}{6}$ so many els square doth the same péece containe.

2 More, if a péece of tapistry do containe 32 Els square, and the same being in length 6 Elles $\frac{1}{4}$. I demaund how many elles in breadth the same péece doth containe? Answere. Divide 32 els by 6 $\frac{1}{4}$ and thereof commeth 5 $\frac{3}{25}$. So many els doth the same péece containe in breadth.

3 More, a péece of cloath being 17 yards $\frac{1}{3}$ in length, and 5 quarters $\frac{1}{2}$ a quarter in breadth, how many yards of $\frac{2}{3}$ and $\frac{1}{2}$ of one third broad, will the same

same péece make? Answer. Sée first by the 5 reduction what part of a yard the $\frac{5}{4}$ and $\frac{1}{2}$ quarter bée, and you shall finde that they make $\frac{11}{8}$ which is one yarde $\frac{3}{8}$. Then multiplie 13 yardes $\frac{1}{3}$ by 1 yarde $\frac{3}{8}$, and you shall haue 18 yards $\frac{1}{3}$ in square, the which you must diuide by $\frac{2}{3}$ and $\frac{1}{6}$ béeing reduced into one Fraction by the Fift Reduction: that is to say, by $\frac{5}{6}$ (because the $\frac{2}{3}$ and $\frac{1}{6}$ béeing brought into one Fraction maketh $\frac{5}{6}$) and you shall finde 22 yardes. So many yardes of $\frac{2}{3}$ and $\frac{1}{6}$ broad doth the same péece containe.

4 More, a Marchant hath bought 4 yards $\frac{2}{3}$ of cloath, being fiue quarters and halfe one quarter broad, to make him a gowne, the which hee will line throughout with blacke Say of $\frac{3}{4}$ of a yard broade. I demaund how much Say hee must buy? Answ. Multiplie the length of the cloth by the breadth, that is to say, 4 $\frac{2}{3}$ by 1 $\frac{3}{8}$ (which is the fiue quarters $\frac{1}{2}$ a quarter) and thereof commeth 7 yardes $\frac{1}{3}$, the which di-

uide

uide by ¾ and you shall finde 10 yardes ⅓. So many yardes of Say must hee haue to line the same 4 yards ⅔ of cloth béeing of 6 quarters, and ½ a quarter broade.

5 More at 6 s. 8 d. the ells square, what shall a peece of Tapestrie cost mee, which is 5 elles ½ long, and 4 ells ½ broad? Answ. Multiplie 5 ½ by 4 ¼, and thereof commeth 23 ells ⅜ square: then say by the Rule of three, if 1 elle square cost mee 6 s. 8 d. what shal 23 ⅜ els cost? Multiplie and diuide, and you shall finde 7 li. 15 s. 10 d. so much the said péece of Tapistrie did cost.

Or otherwise by the Rules of practise, take the ⅓ of 23⅜: and you shal find 7 li. 15 s. 10 d. as aboue is said.

6 More, a péece of Holland cloath containing 42 Elles ⅔ Flemish, how many Elles English doe they make? Heere you must first note, that 100 elles Flemmish, doe make but 60 ells English, and so consequently, 5 elles Flemmish, doe make but 3 elles English.

English. Wherefore say by the rule of Three, if 5 els Flemmish doe make 3 els English; how many Elles English will 42 Els ¾ Flemmish make? Multiplie and divide, and you shall find 25 Els ⅗ English, and so many Els English doth 42 Els ¾ Flemmish containe: the like is to be done in all others.

7 More, I have bought a piece of Tapestrie being 5 Els [illegible] long, and 4 Els ⅔ broade of Flaunders measure, I demaund how many els in square it maketh English measure? Answere: First, forasmuch as 3 els English are worth 5 Els Flemmish, therefore put 3 Elles English into his square, in multiplying 3 by it selfe which maketh 9: likewise multiplie 5 in it selfe squarely, and it will be 25: Then multiply 5 [illegible] which is the length of the piece by 4 ⅔ which is the breadth, and the same commeth 26 els [illegible] square; then say by the rule of three, if 25 elles square of Flemish measure bee worth

9 elles square of English measure, what are 25 Elles Flemmish worth? Multiplie and divide and you shal find that they are worth 9 Els square of English measure.

If Ware at 3 s. 6 d. the el Flemmish, what is the English elle worth after the rate? Answ. First say if 5 elles Flemmish bee worth 3 elles English, what is 1 elle Flemmish worth? multiplie and divide, and you shall find ⅗ of an English elle. Then say againe by the Rule of Three, if ⅗ of an English el bee worth 3 s. 6 d. what is 1 English elle worth? multiplie and divide and you shall finde 5 s. 10 d. so much shal the English el be worth.

If Ware at 6 s. 8 d. the Flemmish ell square, what is the English ell worth? Answe. Say by the aforesaid reason if 25 els Flemmish square, be worth 9 Els square English, what is 1 ell square Flemmish worth? Multiplie and divide, and you shal find $\frac{9}{25}$ of a square

English

English el. Then say, if $\frac{2}{3}$ of an English el be worth 6 s. 8 d. what is one square english el worth? multiplie and diuide, and you shall find 18 shil. 6 d. $\frac{2}{3}$ so much shal one english el square be worth.

Chap. 6.

Of the reducing of the Pawnes of Genes into English yards.

Note that 100 pawns doe make 26 yards & 1 pawne is $\frac{13}{50}$ of a yard after the same rate, & 3 pawnes $\frac{11}{13}$ doe make 1 yard.

Example.

1 I Haue bought 97 Pawnes $\frac{1}{2}$ of Genes veluet, & I would know how many yards they would make? Answere. Say by the Rule of three, if 100 pawnes doe make 26 yards, what wil 97 $\frac{1}{2}$ make? Multiplie and diuide and you shall haue 25 yardes $\frac{7}{20}$. So many yardes doe the 97 pawnes $\frac{1}{2}$ containe.

Or otherwise, take some other num-

ber at your pleasure, as 25 pawnes, which doe make 6 yardes $\frac{1}{2}$, and then say by the rule of three, if 25 pawnes doe make 6 yards $\frac{1}{2}$, what will 97 $\frac{1}{2}$ Pawnes make? Multiplie and diuide, and you shall finde 25 yardes $\frac{7}{13}$ as before.

More, at 2 shillings 7 d. the pawne of Genes, what will the English yard be worth after the rate? Answ. Say by the rule of three, if $\frac{13}{50}$ of an English yard be worth 2 shil: $\frac{7}{12}$. What is $\frac{1}{1}$ yarde worth? Multiplie and diuide, and you shall finde 9 s. 11 d. $\frac{1}{13}$. So much is the English yarde worth. Or otherwise, multiplie 100 pawnes which is 26 yardes by 2 s. 7 d. & thereof commeth 258 s. 4 d. the which you must diuide by 26 yardes, & you shall finde 9 s. 11 d. $\frac{1}{13}$ as before.

3 If 257 Pawnes $\frac{1}{2}$ bee worth 20 l. 16 s. 8 d. What is one yard worth after the rate? Ans. Say by the rule of three, if 257 $\frac{1}{2}$ pawnes bee worth 20 l $\frac{5}{6}$, what are 3 pawnes $\frac{11}{13}$ worth?

Multiplie

Multiplie and divide, and you shall finde $\frac{1230}{2677}$ part of a pound, which is worth 6 s. 2 d. $\frac{2742}{2677}$, and so much is one yard worth.

Chap. 7.

Of Marchandize sold *by waight.*

1. At 9 d. $\frac{1}{2}$ the ounce, what is the li. waight worth? Ans. Say if $\frac{1}{1}$ give 9 $\frac{1}{2}$ what will $\frac{16}{1}$ give? Multiplie and divide, and you shall find 12 s. 8 d. so much is the yard worth?

Or otherwise, by the rules of practise, for 6 pence, take the $\frac{1}{2}$ of 16, which is 8 s. then for 3 d. take the $\frac{1}{4}$ of 16 s. which is 4 s. Finally, for the halfe pence, take 16 ob. which are 8 d. then adde all these numbers together and you shall find 12 s. 8 d. as before.

3. More, at 10 d. $\frac{1}{2}$ the ounce, what are 112 li. waight worth after the rate? Answere. Reduce 112 li. into ounces, in multiplying 112 li. by 16 ounces, & you shall have 1792 ounces; then say

 by

by the Rule of 3, if $\frac{1}{1}$ X 10 $\frac{1}{2}$. $\frac{192}{1}$. Multiplie and diuide, and you shall finde 1 8 8 1 6 d. which doe make 78 l. 8 s. and so much are the 1 1 2 li. worth after 10 d. $\frac{1}{2}$ the ounce.

4. At 12 s. 8 d. the li. waight, what is the ounce worth? Answ. Put 12 s. 8 d. into pence, and you shal haue 152 pence: then say by the Rule of 3, if 16 ounces cost 152 pence, what shall 1 ounce cost? multiplie and diuide, and you shall find 9 pence $\frac{1}{2}$ so much is the ounce worth.

Or otherwise, take the $\frac{1}{4}$ of 12 s. 8 d. for 4 ounces, and thereof commeth 3 s. 2 d. then for one ounce, take the $\frac{1}{4}$ of 3 s. 2 d. and you shall haue 9 d. $\frac{1}{2}$ as before.

5. At 32 li. 10 s. the quintal, that is to say, the 100 li. waight: what is 1 li. waight worth after the same rate? Answ. Put 32 li. 10 s. all into s. and you shal haue 650 s.

Then say by the Rule of three, if 100

giue

giue 650, what wil 1 giue? Multiply and diuide, and you shal finde 6 s. 8 d. so much is the li. worth.

6. If one pound waight of Saffron doe cost me 18 s. 8 d. what shal 3 5 li. 10 ounces cost mee by the same price? Answere: Say by the Rule of three, if $\frac{1}{1}$ × 18 s. 3 5 $\frac{5}{8}$. Multiplie and diuide, and you shall finde 3 3 1 li. 18 s. 4 d. so much are the 3 5 li. 10 ounces worth.

Briefe Rules of waight.

Who that multiplieth the pence that 1 pound waight is worth by 5. 9 and diuideth the product thereof by 1 2, he shal finde how many Poundes in money the quintall is worth, that is to say, how much the 100 pound waight is worth.

And contrariwise hee that multiplieth the poundes of money that the 1 0 0 li. waight is worth by 1 2, and diui-

deth the product by 5, shall finde how many pence the Pound waight is worth.

Example.

At 17 li. the pound waight, what is the 100 li. waight worth?

Ans. Multiplie 17 by 5 and thereof commeth 85, diuide the same by 12 and you shall finde 7 pound 1/12 in Money, which 1/12 is worth one shilling & eight pence. So much is the 100 li. waight worth.

More, at 18 li. the 100 li. waight what is one pound waight worth?

Ans. Multiplie 18 by 12 and thereof commeth 216: the which diuide by 5, and you shall finde 43 d. 1/5 which is 3 s. 7 d. 1/5 and so much is one li. waight worth.

The like is to be done of yards, els, or of any other measure, when wee reckon but 5 score to the hundred.

Briefe Rules for Measure.

Who that multiplieth the pence that one

one elle is worth, by 2. And divideth the product by 4, he shall find how many pounds in money the 120 elles are worth, which 120 els we count but for a Hundred in this place, because of work, which measure is vsed for Canuas onelie.

Or otherwise, if you divide the pennies, that one elle is worth, by 2: you shall haue in your quotient the pounds that the said 120 els are worth, and if any thing remaine, they are parts of a pound.

And contrariwise, he that multiplieth the pounds in money that the 120 elles are worth, by 4, and divideth the of-come by 2, shall finde how many d. the elle is worth.

Or otherwise, if you multiplie the pounds that 120 els are worth, by 2, you shall find in the product how many pennies one elle is worth.

Example.

At 10 pence the elle, what are 120 ells worth? Answere. Multiplie 10 d. by

by 4, and thereof commeth 20. The which diuide by 4, and you shall finde 5 pound, so many pounds in mony are 120 els worth, after 10 d. the elle.

Or otherwise, diuide 10 pennies by 2, and thereof commeth into your quotient 5: which 5 doth represent 5 li. & so many pounds are the 120 els worth, as before.

More, at 9 pound the 120 els, what is one el worth? Answ. Multiplie 9 li. by 4, and thereof commeth 36, the which diuide by 2, and you shall finde 18 d. so much is one elle worth.

Or otherwise, if you multiplie 9 poundes, which is the price that the 120 Elles are worth by 2, you shal haue in the product 18, which 18 doth signifie the pennies that 1 el is worth when the 120 els doth cost 9 pound, as before.

The like is to be done of all maner of wares, which are sold after 120 for the Hundred.

Briefe Rules of our Hundreth waight here at *London*, which *is after* 112 *lib. for the C.*

VVHo that multiplieth the d. that 1 li. waight is worth by 7, and divideth the product by 15, shall finde how many poundes in money the 112 li. waight is worth.

And contrariwise, hee that multiplieth the poundes in money, that 112 li. is worth by 15, and divideth by product by 7, shall finde how many pence one li. is worth.

Example.

At 9 pence the pound waight, what is the 112 li. waight worth? Answe. Multiplie 9 d. by 7, and therof commeth 63, the which divide by 15 and you shall finde 4 li. $\frac{3}{15}$ which being abbreuied, is $\frac{1}{5}$ of a pound, being worth 4 s. And thus the 112 pound is worth 4 pounds, 4 shillings, after the rate of 9 d. the li.

At

At 8 li. the 112 li. waight, what is 1 li. waight worth? Answere. Multiplie 8 li. by 15. and thereof commeth 120 the which diuide by 7, & you shall finde 17 d. $\frac{1}{7}$, so much is 1 li. waight worth when the 112 pound is worth 8 pounds.

Chap. 8.

Of Tares and allowances of Marchandize sold by waight.

AT 12 li. the 100 suttell what shall 987 li. suttell bee worth? In giuing 4 pound waight vpon euery 100 for tret? Answere. Adde 4 li. vnto 100 and you shall haue 104. Then say by the Rule of thrée, if 104 be worth 12 li. what are 987 pound waight worth? Multiplie and diuide and you shall finde 113 li. $\frac{13}{13}$ which is worth 17 s. 8 d. $\frac{4}{13}$. So much shall the 987 li. be worth.

104 | 12 | 987.

2 At 6 s. 8 d. the pound waight, what shall 345 li. $\frac{1}{2}$ bee worth in giuing 4 li. waight vppon euery 100 for the tret. Answ. See first by the rule of Three, what the 100 pound is worth saying, If $\frac{1}{1} \times 6\frac{2}{3}$. $\frac{100}{1}$. Multiplie and diuide, and you shall finde 33 li. $\frac{1}{3}$, then adde 4 li. vnto 100 and they are 104 then say againe by the rule of Three, if 104 li. bee sold for 33 li. $\frac{1}{3}$, for how much shall 345 li. $\frac{1}{2}$ be sold? Multiplie and diuide, and you shall find 110 li. 14 s. 8 d. $\frac{12}{13}$. For so much shall the 345 $\frac{1}{2}$ bee sold, at 6 s. 8 d. the pound in giuing 4 vpon the 100.

3 More, if 100 li. be worth 36 s. 8 d. what shall 780 li. bee worth, in rebating 4 li. vpon euery 100, for tare and cloffe. Ans. multiply 780 by 4, & thereof commeth 3120, The which diuide by 100, and you shall haue 31 li. $\frac{1}{5}$: abate 31 $\frac{1}{5}$ from 780 and there will remaine 748 $\frac{4}{5}$. Then say by the rule of three, if $\frac{100}{1}$ doe cost 36 $\frac{2}{3}$. what will 748 $\frac{4}{5}$ cost after the rate? Multiplie & diuide so

shall

shall you find 174 li. 6 s. $\frac{18}{75}$ & so much shall the 780 li. cost, in rebating 4 li. vpon euery 100, for Tare and Closse.

4. More, whether he doth lose more that giueth 5 li. vpon the 100 or hee that rebateth 5 li. in the 100 for tare and closse? Answ. First note, that hee which giueth 5 li. vppon the 100: giueth 105 for the 100: and he which rebateth 5 li. in the 100, giueth the 100 for 95. Therefore, say by the Rule of three, if 105 be giuen for 100, for how much shall the 100 bee giuen? Multiplie and diuide, and you shall find 95, $\frac{5}{21}$, and hee which rebateth 5 in the 100 maketh but 95 of a 100. so that hee loseth 5 in the 100, and the other which giueth 5 vppon the 100, looseth but 4 $\frac{16}{21}$, vppon the 100. Thus you may see that hee which rebateth 5 in the 100 loseth more by $\frac{5}{21}$ in the 100 then the other which gaue 5 vppon the 100 for tare and closse.

5 If 100 li. of Allom doe cost mee

26 s. 8 d. how shal I sell the li. waight to gaine after the rate of 10 vppon the 100? Answ. Put 26 s. 8 d. all into pence, and you shall haue 320 d. Then say by the Rule of Three, if 100 giue 110, what shall 320 giue? Multiply 320 by 110 and diuide the product by 100, and you shall finde 352 d. Then say againe, if 100 li. bee worth 352 d. what is 1 li. worth? Multiplie and diuide, and you shal haue 3 d. $\frac{52}{100}$ which $\frac{52}{100}$ is worth $\frac{1}{2}$, and $\frac{1}{25}$ of $\frac{1}{2}$. That is to say, the pound waight shall bee worth 3 d. $\frac{1}{2}$, $\frac{1}{25}$ of a halfe pennie in gaining 10 vppon the 100.

8 More, if one li. waight do cost me

6. If one pound waight do cost me 6 s. 10 d. and I sell the same for 7 s. 2 d. I demand how much I shal gain vppon the 100 li. of money after the rate? Answ. Say by the rule of three if $6\frac{5}{6}$ yeeld $7\frac{1}{6}$ what will 100 yeeld? Put the whole numbers into their broken, then multiplie and diuide, and you shal finde $104\frac{36}{41}$, from the which substract 100, and there resteth 4 li. $\frac{36}{41}$ so much

much is gained upon the 100 li. of money after the rate.

7 More. If one pound doe cost me 5 s. 4 d. and I sell the same againe for 4 s. 9 d. I demand how much I shall lose upon the 100 pound of money. Answ. say, if $5\frac{1}{3}$, doe giue but $4\frac{3}{4}$ what shal $\frac{100}{1}$ giue? Put the whole number into their broken, then multiplie and diuide and you shall finde $89\frac{1}{16}$ the which you must subtract from 100, and there will remaine 10 li. $\frac{15}{16}$, so much is lost upon the 100 li. of money.

8 More, if the li. waight do cost me 3 s. 2 d. and I sell it againe for 4 s. 4 d how much shall I gaine upon 20 shil.? Ans. say if $3\frac{1}{6}$ giue $4\frac{1}{3}$ what shall $\frac{20}{1}$ giue? Multiplie and diuide, and you shall finde 27 s. $\frac{7}{19}$ from the which abate 20 s. and there will remaine 7 s. $\frac{7}{19}$ which is 4 d. $\frac{8}{19}$, and so much is gained upon the pound of money, that is to say, upon 20 s.

9 If the pound waight doe cost mee 4 d. 4 s. and I sell it againe for 3 s. 2 d. I demaund how much I shall lose in the pound of money? that is to say in twentie shillings. Ans. Say if $4\frac{1}{5}$ giue but $3\frac{1}{10}$, what will $\frac{20}{1}$ giue? Multiplie and diuide, and you shall find 14 s. $\frac{2}{17}$ the which you must abate from 20 s. and there will remaine 5 s. $\frac{5}{17}$ which $\frac{5}{17}$ is worth 4 d. $\frac{8}{17}$ of a pennie, and so much is lost vpon the pound of monie.

Chap. 9.

Of certaine questions, done by the double rule, and also by the Rule *of three composed.*

1 A Marchant hath sould wines for the summe of 300 pounds, and he hath gained therein after 10 li. vppon the 100 li. The question is to know, how much hee gained in all? Answer. Say by the rule of three, if a 110 li. doe gaine 10 li. what will 300 li. gaine? Multiplie and diuide, & you

shall find 27 li. $\frac{3}{11}$, and so much hath he gained in all.

11 A Marchant hath bought a péece of Hampshire Carsey containing 18 yardes, for the price of 4 li. 10 s. The question is to know, how many yardes hee shall sell for 33 s. 4 d. to gaine 20 s. in the whole péece? Ans. Adde 20 s. unto 4 li. 10 s. and they make 5 li. 10 s. Then say by the rule of thrée, if 5 l. $\frac{1}{2}$ doe yéeld me 18 yards what will 1 li. $\frac{2}{3}$ yéeld? multiplie and diuide, and you shall finde 5 yardes, $\frac{5}{11}$. And so many yardes shall hee sell to gaine 20 s. in the whole péece.

12 A Marchant hath sould Sugars for the Summe of 600 li. readie mony and hee hath gained in the whole, the Summe of 60 li. The question is, to know how much he hath gained vpon the 100 li. Answere. First you must subtract 60 li. from 600 li. and there will remaine 540 li. Then say by the rule of thrée, if 540 li. doe gaine

60 li. what will 100 li. gaine? Multiplie and diuide, and you shall find 11 li. $\frac{1}{3}$. And so much hath he gained vpon the 100 pound.

13 More, if 1 li. waight of maces doe cost mee 5 s. 10 d. and afterward I doe sell the same for 6 s. the li. to be paide for it at the end of 3 monethes: I demaunde how much I shall gaine vppon 100 li. in 12 monethes after the rate? Answ. Say by the first part of the rule of three composed: if 5 s. $\frac{5}{6}$ in $\frac{3}{1}$ monethes doe gaine $\frac{1}{6}$ of a Shilling, which is 2 d. what $\frac{100}{1}$ pound gains in $\frac{12}{1}$ monethes? multiplie and Diuide, and you shal find 11 li. $\frac{3}{7}$. And so much shall I gaine in 12 moneths, after the rate.

14 More, if a piece of Carsey doe cost me 3 li. for what price may I sell the same to bee paide for it at the end of 3 monethes, so that I may gaine thereby after the rate of 10 li. vpon the 100 li. in 12 monethes? Answer. Say by the

first part of the Rule of thre compo-
sed, if 100 pounds in 12 moneths doe
gaine 10 li. what will 36 s. gaine in 3
moneths? Multiplie and divide, and
you shall finde $\frac{1080}{1200}$ of a Shilling, the
which being abbreuied, doth make
$\frac{9}{10}$ of a Shilling, which is worth 10
d. $\frac{4}{5}$. The same you must adde with 36
s. and then you shall haue 36 s. 10 d. $\frac{4}{5}$
And for that price, I must sell the
piece of Kersey for to gaine therein 10
li. vppon the 100 li. in 12 moneths,
and giuing 3 moneths time for the pay-
ment.

More, if 6 yardes of Northerne
Carsey doe cost mee 8 s. and I sel 4
yardes of the same Carsey for 6 shil. I
demaunde whether I gaine or loose,
and how much vppon 100 li. of mo-
ney? Answere. First you must seeke
what the 4 yardes of Carsey did cost:
saying by the rule of three, if 6 yards
doe cost 8 shillings, what will 4 yards
cost? multiplie and diuide, you shall
finde 5 shil. $\frac{1}{3}$ and so much did the said

4 yardes cost, therefore abate the same $5\frac{1}{5}$ from 6 s. and there will remaine $\frac{4}{5}$ of a shilling, which $\frac{4}{5}$ is gained in the same 4 yards of Carsey. Then say againe by the rule of three, if $5\frac{1}{5}$, doe gaine $\frac{4}{5}$: what will $\frac{100}{1}$ gaine? multiplie and divide, and you shall find 12 and $\frac{8}{16}$, which $\frac{8}{16}$ being abbreuied is $\frac{1}{2}$. Therefore it appeareth that I shall gaine 12 li. $\frac{1}{2}$ vpon the 100 li. in selling 4 yardes of the said Carsey for 6 Shillings.

16 More, a Marchant hath bought a peece of Damaske which cost him 8 shil. the yarde ready money, and he selleth the same againe to another Marchant, for 10 s. the yard, but he giueth two daies for the paiment, that is to say, two moneths for one halfe, and 5 moneths for the other $\frac{1}{2}$. The Question is to know, how much the said first Marchant doth gaine vpon 100 li. in 12 moneths after the rate aforesaid? Answ. You must adde the two moneths and the 5 moneths both

together, and they make 7 monethes, whereof you must take the one halfe, which is 3 monethes $\frac{1}{2}$. And at that time, the second Marchant ought to haue paide the whole, at one entire paiment, and therefore say by the first part of the Rule of three composed. If $\frac{3}{1}$ s. in $3\frac{1}{2}$ monethes, doe gaine $\frac{2}{1}$ s. what will $\frac{100}{1}$ gaine in $\frac{12}{1}$ monethes? Multiplie and diuide, and you shall finde 85 li. $\frac{5}{7}$. And so much doth the first Marchant gaine vpon the 100 in 12 monthes.

17 A marchant hath bought Veluet at 13 s. 6 d. the yard readie mony, and hee selleth the same for 14 s. 3 d. the yarde, to bee paid $\frac{1}{3}$ part in readie mony, $\frac{1}{4}$ part at 3 monthes, and the rest which is $\frac{5}{12}$, is to bee paide to him at 5 moneths. The question is, to know how much the first marchant doth gaine vpon the 100 li in 12 monthes, after the same rate? Ans. See first at what time all the paimentes ought to bee paid at once: and for to know the

same

same, you must multiplie euery seuerall paiment, by the time it ought to be paid, and adde them together, then diuide the product by the totall sum of all the paiments being added together. And your quotient will shew at what time all the paiments ought to be paid at once, as in the former examp. $\frac{1}{3}$ part in readie money is not multiplied by any time, because it is paid presently, then $\frac{1}{4}$ part béeing multiplied by 3 monethes maketh $\frac{3}{4}$ of a moneth, and the rest beeing $\frac{5}{12}$ multiplied by 5 monethes bringeth $2\frac{1}{12}$, then adde $\frac{3}{4}$ and $2\frac{1}{12}$ together, and they make 2 monethes $\frac{5}{6}$, the which is the iust time that all the paiments ought to be paid at once. And therfore say by the first part of the rule of thrée composed. If $13\frac{1}{3}$ in 2 moneths $\frac{5}{6}$ doe gaine $\frac{3}{4}$ of a li. what will 100 li. gaine in 12 moneths after the rate? multiplie and diuide, and you shall find 23 pound $\frac{14}{17}$. And so much doth he gaine vpon the 100 li. in 12 monthes.

18. A marchant hath bought fustians which cost him 22 s. 6 d. the péece readie money, and he wil sel the same at 24 s. the péece. The question is to know what time hee ought to giue for the paiment of the same, to the end he may gaine after 9 li. vpon the 100 li. in 12 moneths? Answer. Say if $22\frac{1}{2}$ doe gaine $1\frac{1}{2}$: what wil $\frac{100}{1}$ gaine? Multiplie & diuide, and you shall find $6\frac{2}{3}$ of gaine. Then say againe by the rule of thrée, if $\frac{9}{1}$ of gaine doe require $\frac{12}{1}$ what will $6\frac{2}{3}$ of gaine require? multiply and diuide, & you shal finde $8\frac{8}{9}$, which is 8 moneths & $\frac{8}{9}$. And so long time, ought he to giue, to gaine after the rate of 9 li. vpon the 100 li. in 12 months.

19 A marchant hath bought a péece of Satten, béeing in length 20 yardes which did cost him 12 pounds and 10 shil. readie mony. I demand for what price hee shall sell the yard, to be paid at the end of 2 months, so that he may gaine after the rate of 10 li. vpon the 100 li. in 12 moneths? Answer. Sée

first

first what the yarde did cost him at the first, saying by the rule of three, if 20 yardes cost 12 li. 10 shil. what wil 1 yard cost? multiplie and diuide, & you shal find 12 shil. and 6 d. Then say againe by the Rule of Three, if 12 moneths doe giue mee 10 li. what will 2 moneths giue? Multiplie and diuide and you shall find 1 li. $\frac{2}{3}$. Adde therfore the said 1 $\frac{2}{3}$ unto 100 and they are 101 $\frac{2}{3}$. Say therfore once againe by the rule of three, if $\frac{100}{1}$ doe giue mee 101 $\frac{2}{3}$ what wil 12 $\frac{1}{2}$ giue? multiplie and diuide, and you shall find 12 s. and $\frac{17}{24}$ which is worth 8 d. $\frac{1}{2}$, & for 12 s. 8 d. $\frac{1}{2}$ must he sel the yard of Satten giuing 2 months time for the paiment to gain after the rate of 10 pound upon the 100 pound in 12 months.

20 More if 1 li. waight of Sinamon doe cost me 8 s. readie mony, for what price shal I sell 100 li. waight of the same, to bee paid the $\frac{1}{4}$ at 1 month and the residue at the end of three months, so that I may gaine after 9 li. upon

the 100 li. in 12 monethes after the rate? Answere.

seeke first in how long time, both the Payments should bee made	$\frac{1}{4}$.	$\frac{1}{2}$.	$\frac{1}{8}$.
	$\frac{3}{4}$.	$\frac{3}{1}$.	$2\frac{1}{4}$.
	$2\frac{3}{8}$ *moneth.*		

at once. The which to doe you must multiply each paiment of mony, by the time when it ought to bee paid, that is to say, you must multiplie the first payment which is $\frac{1}{4}$ part by $\frac{1}{2}$ moneth and thereof cometh $\frac{1}{8}$ of a month. Likewise you must multiplie the next payment which is $\frac{3}{4}$ by 3 monthes & thereof will come 2 moneths $\frac{1}{4}$. Then add $\frac{1}{8}$ of a moneth, and 2 monethes $\frac{1}{4}$ both together, and they make 2 moneths $\frac{3}{8}$ which is the time that both the payments ought to be paid at once. Then say by the Rule of three, if 12 months doe giue 9 li. what will 2 monethes $\frac{3}{8}$ giue? Multiplie and diuide, and you shall find $1\frac{7}{8}$, say againe by the Rule of Three. If 1 li. waight doe cost me 8 s. what will 100 li. cost? Multiply and diuide, and you shall finde 40 li.

Then

Then say once againe, if $\frac{100}{1}$ doe giue $101\frac{7}{8}$, what will $\frac{40}{1}$ giue? Multiplie and diuide, and you shall finde $40\frac{3}{4}$. And for 40 li. 15 s. I must sell 100 l. waight of Sinamon, to bee paid at the two seuerall times aforesaid, to gaine therein after the rate of 9 li. vpon 100 li. in 12 moneths, as by example aforesaid.

20 When the quarter of wheat doth cost 6 s. 8 d. the loafe of bread weighing 20 ounces, is sould for a halfe penny. I demand that if the quarter of wheate did cost ten shillinges, for how much shall the loafe of bread bee sould, that weigheth 16 ounces? you shall answer by the first part of the Rule of Three composed, which is mentioned in the second Chapter of the third part of this book, where you must say by the same first part of the rule of 3 composed, if $6\frac{2}{3}$ | $\frac{20}{1}$ | $\frac{1}{2}$ | $\frac{10}{1}$ | $\frac{16}{1}$.

Then multiplie the first number by the second, and the product thereof shall be your diuisor. Likewise multi-

ply

plie the other thrée numbers the one by the other, & the product therof shalbe your dividend: as thus, first, multiply $6\frac{2}{3}$ by $\frac{20}{1}$ and thereof cometh $\frac{400}{3}$ for your divisor, then multiplie $\frac{1}{2}$ by $\frac{10}{1}$ and the product thereof by $\frac{16}{1}$, so you shall have $\frac{160}{2}$ for your number that is to bée divided, then divide $\frac{160}{2}$ by $\frac{400}{3}$ & therof commeth $\frac{480}{800}$ the which being abbreviated bringeth $\frac{3}{5}$ of a pennie: and for that price must the loafe of bread bee sold, which weigheth 16 ounces, when the quarter of wheat is worth 10 s.

Or otherwise by the Rule of thrée at two times. First say, if $\frac{20}{1}$ ounces giue $\frac{1}{2}$, what wil $\frac{16}{1}$ ounces giue? multiply and diuide, and you shall finde $\frac{2}{5}$ of a peny. Then say againe, if $6\frac{2}{3}$ doe giue me $\frac{2}{5}$, what will $\frac{10}{1}$ giue? Multiplie and diuide, and you shall find $\frac{3}{5}$ of a pennie, as afore is said.

21 When the carriage of one hundreth waight of marchandise 50 miles, doth cost 5 s. what shal the carriage of 500 waight

waight cost me for 16 miles? Answe. By the first part of the rule of 3 composed, saying, if 100 | 50 | 5 | 500 | 16. Multiplie 100 by 50, the product will be 5000, which shal bee your divisor. Then multiplie 5 times 500 by 16, and thereof commeth 40000 for your dividend. Therefore divide 40000 by 5000, and you shal finde 8 s. so much shall cost the carriage of 500 waight 16 miles.

Or otherwise by the double rule of three, that is to say, by the rule of 3 at two times: first say, if 50 miles doe pay 5 s. what shal 16 mies pay? multiplie and divide, and you shal find 1 s. $\frac{3}{5}$. Then say againe, if 100 waight do cost mee 1 s. $\frac{3}{5}$ what shall 500 waight cost? multiplie and divide, and you shall find 8 s. as before.

21 When the carriage of 100 pound waight of marchandize 84 miles doth cost mee 6 s. how many miles may I have 64 pound waight, carried for 3 s. 4 d. Answ. By the second part of the

Rule

Rule of Three composed, and say if $\frac{100}{1} | \frac{84}{1} | \frac{6}{1} | \frac{64}{1} | 3\frac{7}{12}$.

Then multiplie the fourth number $\frac{64}{1}$, by the third number $\frac{6}{1}$ and thereof commeth $\frac{384}{1}$ for your diuisor. Likewise multiplie $3\frac{7}{12}$ by $\frac{100}{1}$, and by $\frac{84}{1}$, and you shall haue in the product $\frac{8400}{3}$, then diuide $\frac{8300}{3}$ by $\frac{384}{1}$, and you shall finde 78 miles, and $\frac{11}{15}$ of a mile. So many miles shall the 64 li. waight be carried, for 3 s. 7 d.

Otherwise by the rule of three, at two times: First, say if 100 waight doe cost mee 6 s. what will 64 pound waight cost? Multiply and diuide, and you shall find 3 s. $\frac{21}{25}$. Then say if 3 $\frac{21}{25}$ be paid for 84 miles carriage: for how many miles shall 3 s. $\frac{7}{12}$ bee paid? multiplie and diuide, and you shall find 78 miles $\frac{11}{15}$ as before.

23 If 100 horses, in a 100 daies doe spend 180 quarters of oats: how many quarters of Oats will 350 horses spend in 150 daies? Answer. By the first part of the rule of three composed you must multiplie 180 times 350 by

350: and diuide the product by 100 times 100: and you shall finde 945 quarters. So many quarters of oats will 350 horses spend, in 150 daies. Or otherwise by the Rule of 3 at two times: First say, if 100 daies do yeeld me 180 quarters of oats: what shall 150 daies yeeld? multiplie and diuide, and you shall find 270 quarters: then say againe, if 100 horses do spend 270 quarters of oats how many quarters of oats will 350 horses spend? multiplie and diuide, and you shall find 945 quarters, as before.

Chap. 10.

Of the Rule of Fellowship, without any time limited.

The Rule of fellowship is thus, you must set downe each mans sum of money that hee layeth into company, euery one directly vnder the other, the which sums you shall adde all together, and the Totall summe

sum of al their whole stocks being thus assembled shall be your common diuisor, to the finding out of euery mans part of the gaine. Then you shall multiplie either the gaine, or else the losse which soeuer of them doth happen by each mans portion of mony that he laid in, and diuide the products by the sayd diuisor: so shal you haue in your quotient euery mans part of the gaine, if any thing be gained, or else of the losse if any thing be lost.

Example.

1 Two Marchants haue laid their money in company together: The first laid in 500 li. The second laide in 300 pounds, and with trading they haue gained 64 li. I demand, how much each man shall haue of the same gaines according to the money that hee laid in? Answer. Adde 500 and 300 both together, which are the parcels or summes that they both laid in, and thereof commeth 800 for your diuisor: then say by the rule of Three,

if 800 li. which is the whole stocke do gaine 64 li. what will 500 li. gaine? (which is the first mans mony that hee laid in in) multiplie and divide and you shall find 40 li. for the first mans part of the gaine: then say if 800 give 64, what will 300 give? Multiplie and divide, and you shall finde 24 li. for the second mans part of the gaine.

500 |
300 | 800 | 64 | 500.
800

800 | 64 | 300.

Or otherwise, put 500 li. which is the first mans money that he laid in, over the 800 li. which is the whole stocke, and you shal have $\frac{500}{800}$ which being abbrevied, doe make $\frac{5}{8}$ and such part of the gaine shall the first man take, that is to say $\frac{5}{8}$ of 64 li. which is 40 li. And consequently, by the same maner, the second shall take the $\frac{3}{8}$ of 64, which is 24 pound, for his part of his gaine, as

before.

5 | 00	|	3 | 00	
8 | 00	|	8 | 00	

2 Two Marchants haue companied together, the firſt laid in 640 li. and hee taketh $\frac{5}{8}$ partes of the gaine, I demand how much the ſecond Marchant laid in? Anſw. Séeing that the firſt Marchant taketh $\frac{5}{8}$ of the gaine it followeth that ÿ ſecond Marchant muſt haue $\frac{3}{8}$, which is the reſt, and therfore ſay by the rule of thrée, if $\frac{5}{8}$ of the gain which the firſt man taketh, did lay into the ſtocke $\frac{640}{1}$. How much ſhall $\frac{3}{8}$ of the gaine lay in, which is the ſecond mans gaine? Multiply and diuide, and you ſhal find 384 li. ſo much ought the ſecond man to lay into company.

3 Two Marchants haue companied together, the firſt man laid in 640 li. and the ſecond hath laid in ſo much money for his part, that he muſt haue 60 li. for his part of 100 li. that they haue

haue gained. I demaund how much the second man did lay into company. Answere. Seeing that the second man taketh 60 Li. of the gaine, it followeth that the first must haue the rest of the 100 Li. which is but 40 pound. Therefore say by the rule of Thrée, if 40 Li. doe lay in 640 Li. what shall 60 Li. lay in? Multiplie and diuide and you shal find 960 Li. so much did ẏ second marchant lay in.

4 Two Marchants haue companied together, The first laid in 83 Li. 6 s. 8 d. The second laid in 170 Duckets and they haue gaine 1 0 0 pound of the which the first man must haue 60 Li. I demaunde what the Ducket was worth?

Answe. Seeing that the first man must haue 6 0 Li. It followeth that the second must haue 40 Li. Therfore say by the rule of Thrée, if 60 Li. of gaine that the first man taketh, did lay in 83 Li. 6 s. 8 d. principall, how much shall 40 li. gaine put in, which is the gaine

that the second man taketh, multiply and diuide, and you shall finde 55 li. ⅓ so much are the 170 Duckets worth. Then put 55 li. ⅓ into Shillings, and you shall haue 1111 s. $\frac{1}{3}$. So then for to know what the Ducket is worth, say by the rule of Three, if $\frac{170}{1}$, giue 1111 $\frac{1}{3}$, what will $\frac{1}{1}$ giue? multiply and diuide, and you shall finde 6 s. 6 d. $\frac{22}{51}$ so much is the Ducket worth.

5 Two Marchants haue companied together, the second man laid in more by 30 li. then did the first man, and they gained 120 li. of the which the first man ought to haue 50 li. I demand what each of them did lay in? Answ. From 120 li. abate 50 li. and there resteth 70 pound, for the second mans part: so that by this meanes the second man (because hee laid in 30 li. more, than the first man did) he taketh 20 li. more of the gaine: & therfore say by the rule of three, if 20 li. gaine, did lay in 30 li. principall, how much shall 50 li. gaine lay in? multiply and diuide, and
you

you shall finde 75 li. so much did the first man lay in, and consequently the second laid in 105 li.

6 Two Marchants haue companied together, the second hath laid in twice so much as the first man did, and 10 li. more: and they haue gained 100 li. of the which, the first ought to haue 30 li. for his part: I demaund how much each of them did lay into company? Answer. If it were not for the 10 li. that the second man laid in more than the first, hee should haue had but 64 li. of the gaine, which is the double of the first mans part. But because hee laid in 10 li. more, hee hath therefore 4 pound more of the gaine, and therefore say by the rule of three: if 4 li. gaine did lay in 10 li. of principall (which was ouer and aboue the double of the first mans layings in) what shal 32 li. of gaines lay in, which is the first mans parte of the gaines that he taketh? multiplie and diuide, and you shall finde 80 pound for the first mans laying in: and so consequently 170 li.

for the second mans portion that hee laid in.

7 Two Marchants haue companied together, and they haue gained 100 li. of the which the first must haue after the rate of 10 li. vpon the 100 li. & the second must haue after the rate of 15 li. vppon the 100 li. I demand how much each of them ought to haue Answer. Put 10 li. for the first mans laying in, and 15 l. for the second mans laying in. Adde therefore 10 li. and 15 li. together, and they make 25 li. Then put 10 ouer 25, & it is $\frac{10}{25}$ which beeing abbreuied are $\frac{2}{5}$. Therefore he that taketh 10 pound vppon the 100 li. must haue the $\frac{2}{5}$ of the gaine, which is 40 li. Then put 15 ouer 25, and it is $\frac{15}{25}$ which beeing abbreuied are $\frac{3}{5}$. Therefore the second must haue $\frac{3}{5}$ of the 100 li. which is 60 li.

8 Two Marchants haue companied together, The first laid in 46 li. 18 s. and the second laid in 33 pound 2 s. so they

they haue gained 30 pound. I demand how much euery man shall haue for his part of the gaine: Answere. Adde 46 li. 18 s. & 33 li. 2 s. both together, and you shall finde 80 li. for your common diuisor: then say if 80 li. which is all their stocke, do gaine 30 li. what will 46 1/2 gaine? which is the money that the first man laide in? Multiply and diuide, and you shall finde 17 li. 11 s. 9 pence, for the first mans part of the gaine. Then say againe by the rule of three, if 80 li. doe gaine 30 li. what will 33 li. 1/10 gaine, which was the second mans money that hee laide in? multiplie and diuide, and you shall find 12 li. 8 s. 3 d. for the second mans part of the gaine.

And after the same maner shall you doe, in case that they were 3 or 4 marchants that would company together. Adding all and euery of their sums of mony (which they lay into the stocke) into one totall summe, which shall be your common diuisor: and then worke with the rest, as is taught in the for-

mer question of the rule of company.

Example.

9 Thrée Marchants haue companied together, the first laid in I know not how much: the second did put in 20 péeces of cloth: and the third hath laid in 500 Pound. So at the end of their company, their gaines amounted unto 1000 pound, wherof the first man ought to haue 350 Pound, and the second must haue 400 pound.

Now I demaund how much the first man did lay in, and for how much the 20 péeces of cloath were put into company.

Answere.

Séeing that the first, and the second Marchants must haue 750 li. for their part of the gaine. Then the third man must haue the rest of the 1000 li. which is 250 li. And therefore say by the Rule of thrée, if 250 li.

gaine,

gaine, become of 500 li. principall of how much shall come 350 li. gaine, which the first man taketh? multiply and divide and you shall finde 700 li. So much did the first man lay in: then say if 250 li. gaine, become of 500 li. principall, of how much will come 400 li. which is the gaine that the second man taketh. Multiplie and divide, and you shall find 800 li. For that price were the 20 peeces of cloath laid into company.

10 Three Marchants have gained 100 li. the first must have the $\frac{1}{3}$ the second must have $\frac{1}{3}$ and the third must have $\frac{1}{4}$. I demaund how much every man must have of the gaine? Answ. Reduce $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$, into a common denomination, after the order of the second Reduction in Fractions, and you shall finde $\frac{12}{24}$, for the $\frac{1}{2}$, $\frac{8}{24}$ for the $\frac{1}{3}$, and $\frac{6}{24}$ for the $\frac{1}{4}$: Then take 12 for the first mans laying in, 8 for the second mans laying in, and 6 for the third mans laying in. The which

three

thrée Numbers being added together, shall be your common diuisor: & they doe make 26. Then multiply 100 li. by 12, for the first man: then againe 100 li. by 8 for the second: and last of all 100 li. by 6 for the third man. And diuide the products of euery multiplication by 26. So shall you find 46 li. $\frac{2}{13}$ for the first mans part of the gaine 30 li. $\frac{10}{13}$ for the second mans part: and 23 li. $\frac{1}{13}$, for the third mans part.

11 Two Marchants haue gained 100 li. The first must haue $\frac{1}{2}$ and 5 li. more, the second must haue $\frac{1}{3}$ and 4 li. more, I demaund how much each of them shall haue? Answ. First from 100 abate 5 and 4, which are 9, so there will remaine 91, then take the $\frac{1}{2}$ of 100 li. which is 50 li. for the first mans laying in. Likewise, take $\frac{1}{3}$ of 100 li. for the second mans laying in, which is 33 li. $\frac{1}{3}$: Then adde 50 li. and 33 li. $\frac{1}{3}$ together, and you shall haue 83 li. $\frac{1}{3}$ for your common diuisor: then multiplie 91 pound by 50, and diuide

by

by $83\frac{1}{3}$, and thereof commeth 54 li. $\frac{3}{5}$, unto the which Number adde 5, and all is 59 li. $\frac{3}{5}$ for the first mans part of the gaine. Likewise multiplie 91 by $33\frac{1}{3}$, and divide by $83\frac{1}{3}$, and you shall find 36 li. $\frac{2}{5}$, unto the which adde 4, & you shall have 40 li. $\frac{2}{5}$ for the second mans part.

12 Two Marchants have gained 100 li. The first must have the $\frac{1}{2}$ lesse by 4 Pound. The second must have $\frac{1}{3}$ lesse by 2 Pound. I demaunde how much each of them shall have? Answ. Adde 4 and 2 with 100, and they make 106. Then take as before is said, 50 li. for the first man: and $33\frac{1}{3}$ for the second: and adde them both together, and they be $83\frac{1}{3}$, which shall bee your divisor. Then multiply 106 by 50, and divide the product by 83 li. $\frac{1}{3}$, so thereof commeth 63 li. $\frac{3}{5}$. From the which abate the 4 li. lesse that the first man taketh, and then is there remaining 59 li. $\frac{3}{5}$ for his part. Likewise multiplie 106 by $13\frac{1}{3}$, and divide by $83\frac{1}{3}$

and

and you shall finde 42 li. $\frac{2}{3}$ from the which abate 2 pound lesse, and there remaineth 40 li. $\frac{2}{3}$ for the second mans part.

The Rule of Fellowship, with time.

The money that euery man laieth in, must be multiplied by the time that it continueth in company: and of that which commeth thereof, you shall make their new layings in for each of them: and then multiplie the gains by euery one of them seuerally, & the of-comes you shall diuide by all their new layings in added together, & then you shall haue proportionally, each mans part of the gaine according to his laying in.

Example.

1 Two Marchants haue companied together, the first hath put in the first of Januarie 450 pound, the second did lay in the 1 of May, 750 pounds.

And at the yeeres end, they had gained 100 li. I demaund how much each of them shall haue of the gaine? An. Forasmuch as the first did put 450 li. the first of January, his money continued in company 12 moneths, and therefore multiplie 450 by 12 months, and thereof commeth 5400 for his new laying in. And the second laid in his 750 li. but at the first day of May: so that his mony remained in cõpany but 8 months. Therefore multiplie his 750 pound by 8, and thereof commeth 6000 for his new laying in. Then adde 5400 with 6000, & they make 11400 for your common diuisor. Then multiplie 100 li. which is the gaines by 5400: and diuide the product by 11400, and thereof wil come 47 pound $\frac{7}{19}$ for ẏ first mans part of the gaine. Likewise, multiply 100 by 6000: and diuide the product by 11400, and you shall find $52\frac{12}{19}$: and so much the second man hath for his part of the gaine.

2 Two Marchants haue companied together, the first hath laid in the first

first of Januarie 640 li. The second can lay in nothing untill the First of Aprill. I demaund how much he shall then lay in, to the end that hee may take halfe the gaine? Answer. Multiplie 640 li. by 12 monethes, that his money abideth in company; and thereof will come 7680 pound for his laying in. And so much ought the second man to lay in, for because he taketh $\frac{1}{2}$ of the gaine. But for that, that hee putteth in nothing untill the first of Aprill his money can bee in company no longer than 9 months. And therefore divide 7680 by 9, and thereof will come 853 li. $\frac{1}{3}$. So much ought the second marchant to lay in the first of Aprill, to the end that hee may take the one halfe of the gaines.

3 Three Marchants have companied together, The first laid in the first of March 100 li. The second laide in the first of June so much money, that of the gaine, he must have the $\frac{1}{3}$ part: and the third laide in the First of November

uember so much Money, that of the gaines hee must haue likewise $\frac{1}{3}$, and they continued in company untill the next March following. I demaund how much the Second and the Third Marchants did lay in? Answere. Multiplie 100 Pound which the first man did lay in, by 12 months, that his money continued in company, and thereof commeth 1200 for his laying in, and so much ought the second and the third Marchants each of them to lay in, because they part the gaines by thirds. But for that the second marchant layeth in nothing till the first of June, his money can bee in company but 9 moneths. Therefore diuide 1200 by 9 moneths, and thereof will come 133 $\frac{1}{3}$. And so much ought the second marchant to lay in. Then, forasmuch as the third marchant did lay in nothing untill the first of November: his money abideth in company but the space of 4 moneths. Therefore diuide 1200 by 4, and therof commeth 300 li. And so much ought the third Marchant

chant to lay into company.

4 Thrée Marchants haue companied together, the first laid in the first of January 100 Duckets. The second hath laide in 50 li. the first of March, and the third put in a Jewell, the first of July, and at the yéeres end, they had gained 400 Crowns: of the which the first Marchant must haue 50 Crownes, and the second must haue 80. I demaund what the Ducket was worth, and at what price the Jewell was valued, which the third Marchant laid in? Answ. The first mans Money béeing 100 Duckets multiplied by 12 is 1200 Duckets by the rule aforesaid, and he taketh 50 crownes for the gaine: therefore say if 50 crownes gaine bee come of 1200, which was his stocke, of how much shall the 80 crownes gaine, that the second man taketh? Multiply and diuide, and you shall finde 1920, for the second Marchants laying in. Then say againe, if 50 crownes bee

come

come of 1200 stocke, of how much shall come 270 Crownes, which the third man taketh of the gaine? multiplie and diuide, and you shall find 6480 for the Third Marchants laying in. Then diuide 1920, which is the second mans laying in, by ten moneths that his mony did continue in companie and you shall find 192 Duckets, which are worth 50 pound because he laid in 50 li. Then diuide 50 li. (being first reduced into shillinges by the said 192 Duckets) and thereof will come 5 shillinges 2 pence $\frac{1}{2}$. So much was the Ducket worth: Finally, diuide 6480, (which is the third mans laying in) by 6 moneths that his Jewell remained in company, & you shal finde 1080 Duckets, and for that price was the Jewell put into companie.

§ Three Marchants haue companied together: The first laid in the first of January 100 li. and the first of Aprill he hath taken backe againe 20 li.

 The

The second hath laid in the first of March 60 pound, and afterward he did lay in more 100 li. the first of August The third laid in the first of July 150 li. And the first of October he did take backe againe 50 li. And at the yeeres end, they found that they had gained 160 li. I demaund how much every man shall have of the gaine? Answe: Multiplie 100 li. which the first man laide in by 12 monethes, and thereof commeth 1200 li. from that Number abate 9 times 20 li. which are 180 for that which hee did take backe againe: and there will remaine 1020, for the first mans laying in. Then multiply 60 which the Second man laide in by 10, and you shall have 600: unto the which adde 5 times 100 li. for the mony hee laid in more the first of August, which are 500, so all amounteth to 1100 for the 2 mans laying in. Afterwardes multiplie 150 Pound, which the Third man hath laide in, by 6 monethes, and thereof commeth 900 from the which Number abate 3 times 50,

and

and they are 150 for the money that he did take backe againe, the first of October, so there will remaine 750, for the third mans laying in. Then proceed with the rest, as is taught in the first question of the rule of fellowship with time in adding 1020, 1100 and 750 altogether, which shall be your diuisor. Then multiply 160 li. which is the gaine by 1020, by 1100 and by 750: and diuide at euery time by your diuisor, that is to say, by all their layings in, added together, which is 2870: so you shal find $56\frac{248}{287}$ for the first man: $61\frac{93}{287}$ for the second: and $41\frac{233}{287}$ for the third man.

6 Two Marchants haue companied together, The first hath laide in 960 Pounds for the space of 12 monethes, and hee ought to haue 8 Pound vppon the 100 li. of the gaine. The second hath laide in 1120 li. for the space of 8 moneths, and hee ought to haue after 12 pound vppon the 100 pound of the gaine.

And at the yeeres end, they haue gained 800 li. I demand how much each of them shall haue of the gaine? Answere. Multiplie 960 that the first man did lay in by 12 moneths, and the product thereof multiplie againe by 8, and you shall haue 92160, for the first mans laying in: then multiplie ŷ 1120 that the second hath laid in, by 8 moneths, and that which commeth thereof, you shall multiplie againe by 12 & you shall find 107520, for the second mans laying in. Then proceed with the rest, as in the first question of the rule of Fellowship is declared, as in the last example I haue taught you and you shall finde 369 li. $\frac{3}{13}$ for the first man: and 430 li $\frac{10}{13}$ for the second man.

The Rule of Company, betweene Marchants, and their *Factors.*

7 NOte that the estimation of the body, or person of a Factor, is in

in such proportion to the stocke which the Marchant layeth in, as the gaine of the said Factor is unto the gaine of the marchant. As thus, if a marchant do deliuer into the hands of his factor 200 li. to employ, and he to haue halfe the profit, the person of the said Factor shall be esteemed to bee worth 200 li. And if the Factor doe take but the $\frac{1}{3}$ of the gaine, he should haue but $\frac{1}{2}$ so much of the gain as the marchant taketh which must haue $\frac{2}{3}$: wherfore the person of the Factor is esteemed but the $\frac{1}{2}$ of that which the marchant laieth in, that is to say 100 li.

And if the Factor did take the $\frac{2}{5}$ of the gaine, then the marchant shal take the residue, which are $\frac{3}{5}$ of the gaine: wherefore the gaine of the Marchant unto that of the Factor, is in such proportion as 3 unto 2. Then if you will know the estimation of the person of the Factor, say if 3 giue mee 2, what will 200 giue? Multiply 200 by 2, and diuide by 3, so you shall finde $133\frac{1}{3}$. Or otherwise, you must con-

sider that the factor taketh the $\frac{2}{3}$ of that which the marchant taketh. And therfore take the $\frac{2}{3}$ of 200, and you shal find $133\frac{1}{3}$ as before: and so much is the person of the factor esteemed to be worth.

8 And if the Marchant should deliuer unto his factor 200 Li. and the factor would lay in 40 Li. and his person to the end he might haue the halfe of the gaine: I demaund for how much shall his person be esteemed? Answ. Abate 40 Li. from 200 li. and there will remaine 160 li. And at so much shal his person be esteemed.

And if the Factor would take the $\frac{2}{3}$ of the gaine, his person with his 40 pound shal be esteemed twice as much as the stocke that the marchant layeth in, which should haue put $\frac{1}{3}$ of the gaine, for $\frac{2}{3}$ unto $\frac{1}{3}$ is in double proportion. Therefore double 200 Pounds, and thereof commeth 400 li. from ẏ which abate 40 li. and there will remain 360 li. But if the Factor would take onely

ly the $\frac{1}{3}$ of the gaine, that shall bee but the $\frac{1}{2}$ of $\frac{2}{3}$ which the marchant taketh: and then the estimation of his person with his laying in should bee esteemed but the halfe of that which ye marchant layeth in: you must therefore take the $\frac{1}{2}$ of 200 li. which is 100 pound from the which you shall abate 40 pound, and the rest which is 60 pound is the estimation of his person.

9 If it so chance for to make trafficke of 240 li. that the person of the factor should bee in such wise esteemed that hee should haue but the $\frac{1}{4}$ of the gayne, and yet he would haue the $\frac{2}{3}$. I demaunde how much readie money he ought to lay in, besides his person? Answer. Seeing that his person gayneth the $\frac{1}{4}$, therefore all the whole laying in, which is 240 li. shall gaine the rest, that is to say the $\frac{3}{4}$. Now because $\frac{1}{4}$, is the $\frac{1}{3}$ of $\frac{3}{4}$, therefore his person shall be esteemed the $\frac{1}{3}$ of all the laying in. Take then the $\frac{1}{3}$ of 240 li. and you shall haue 80 li. for the estimation of

his person, and for because that hee will haue halfe of the gaine, you shall adde 80 li. with 240 li. and thereof commeth 320 li. of the which take the halfe, which is 160 li. and from the same you shall abate the 80 li. & there wil remaine other 80 pound, which hee ought to lay in of ready money, & the Marchant must lay in the ouerplus, which amounteth to 160 li.

10 A Marchant hath deliuered to his Factor 1200 li. to gouerne them in the trade of marchandize vpon such condition, that hee for his seruice shal haue the $\frac{1}{3}$ of the gaine, if any thing bee gained, and he shall beare the $\frac{1}{3}$ of the losse, if any thing be lost: I demaund, for how much his person was esteemed? Answe. Seeing that the Factor taketh the $\frac{1}{3}$ of the gaine, his person ought to bee esteemed as much as $\frac{1}{2}$ of the stocke which the marchant layeth in, that is to say, the $\frac{1}{2}$ of 1200 li. which is 600 li. The reason is, for because the $\frac{1}{3}$ of the gaine that

that the Factor taketh, is the $\frac{1}{3}$ of the $\frac{2}{3}$ of the gaine that the marchant taketh. And so the Factor his person is estéemed to be worth 600 li.

11 A Marchant hath deliuered vnto his Factor 1200 li. and the Factor layeth in 500 li. and his person. Now because hee layeth in 500 li. and his person, it is agréed betwéen them, that he shall take the $\frac{2}{5}$ of the gaine: I demaund, for how much his person was estéemed? Answere. Forasmuch as the Factor taketh the $\frac{2}{5}$ of the gaine, hee taketh the $\frac{2}{3}$ of that which the marchant taketh for $\frac{2}{5}$ are the $\frac{2}{3}$ of $\frac{3}{5}$: and therefore the Factors laying in, ought to bee 800 li. which is the $\frac{2}{3}$ of 1200 li. that the Marchant laide in. Then abate 500 li. which the Factor did lay in from 800 li. which should bee his whole [illegible] and there remaineth 300 li. for the estimation of his person.

12 More, A Marchant hath deliuered vnto his Factor 1000 li. vppon such

such condition, that the Factor for his paines & seruice, shall haue the gaines of 200 li. as though he laid in so much ready money: I demaund what portion of the gaine the sayd Factor shall take? Answere. Sée what part the 200 li. (which the Factor laide in) is of 1200, which is the whole stocke of their company, and you shall find that it is the $\frac{1}{6}$, and such part of the gaine shall the Factor take.

But in case, that in making their couenants, it were agréed betwéene them, that the Factor should haue the gaine of 200 pound of the whole stocke which the marchant layeth in, that is to say of the 1000 li. Then should the Factor take the $\frac{1}{5}$ of the gaine: for 200 li. is the $\frac{1}{5}$ of 1000 li.

Chap. 11.
Of the Rules of Barter, that is to say, to change ware and ware, &c.

1 TWo Marchants will change their marchādize, the one with the

the other. The one of them hath cloth of 7 s. 1 d. the yard, to sell for ready money, but in barter he will sell it for 8 s. 4 d. The other hath Sinamon of 4 s. 7 d. the li. to sell for ready monie I demaund how he shall sell it in barter that hee bee no looser? Answere. Say if 7 $\frac{1}{12}$ (which is the price that the yard of cloth is worth in ready mony) bee sould in barter for 8 $\frac{1}{3}$, for what shall 4 $\frac{7}{12}$ bee sould in barter, which 4 $\frac{7}{12}$ is the price that the pound of sinamon is worth in ready money? reduce the whole numbers into their broken, and then multiplie and diuide and you shall finde 5 s. 4 d. $\frac{12}{17}$ parts of a penny and for so much shall he sell the pound of Sinamon in barter.

2 Two Marchants wil barter their marchandize the one with ye other: the one of them hath chamblets of 2 pound 18 s. 4 d. the péece, to sell for ready money, and in barter he will sell the péece for 4 li. 3 s. 4 d. the other hath fine caps of 35 s. 10 d. the dozen, to sell in barter

ter. I demaund what the Dozen of cappes were worth in readie money? Answere. Say if 4 li. 3 s. 4 d. which is the ouer price of the peece of Chamblet, become of 2 li. 18 s. 4 d. which was the iust price of the same, of what shal come 35 s. 10 d. which is the ouerprice of the Dozen of caps? Multiply and diuide, and you shall find 25 s. 1 d and so much are the Dozen of Cappes worth in readie money.

3 Two Marchants will change their marchandize the one with the other: the one of them hath fusteans of 18 s. 4 d. the peece, to sel for ready money, and in barter he will sell the peece for 26 s. 8 d. The other hath tapestry of 15 d. the elle to sell for ready mony and in barter he will sel it for 20 d. the elle. I demaund which of them gaineth, and how much vpon the 100 li. of money? An. Say if 18 s. $\frac{1}{3}$ (which is the iust price of ye peece of fustean) bee sold in barter for 26 s. $\frac{2}{3}$: for how much shall 1 s. $\frac{1}{4}$, which is the iust price of the elle of tapestry) bee sold in barter

barter? multiply and divide, and you shall finde 21 d. $\frac{9}{11}$. And he doth ouer sell it but for 20 d. So that of 21. $\frac{9}{11}$. he maketh but 20 d. And therfore say by the rule of thrée, if the second marchant, of 21 $\frac{9}{11}$ doe make but $\frac{20}{1}$, how much shall hee lose in the $\frac{100}{1}$. Multiplie and divide, & you shall find 91 $\frac{2}{3}$ the which béeing abated from 100, there will remaine 8 $\frac{1}{3}$. And after the rate of 8 $\frac{1}{3}$, doth the second marchant lose in the 100. And consequently, the first marchant of 20 d. maketh 21 d. $\frac{9}{11}$, and therfore say againe by the rule of thrée, if the first marchant of $\frac{20}{1}$ doe make 21 $\frac{9}{11}$, how much shall hee gaine upon $\frac{100}{1}$, Multiplie and divide, and you shall finde 109 li. $\frac{1}{11}$. And thus the first marchant gayneth after the rate of 9 li. upon the 100 li. of money.

For your better understanding of these Questions, you must note, that when one Marchant gaineth of another after the rate of 10 pound upon ÿ 100 li. hee gaineth the $\frac{1}{10}$ of his owne principall, and the other which loseth Note.

after

after the rate of 9 $\frac{1}{11}$ in the 100 pound hee looseth the $\frac{1}{11}$ of his principall. And it may bee prooued thus: when one Marchant will sell his wares vnto another, which wares stand him but in 100 pound, and hee will sell them for 110 pound, therefore hee of his 100 li. maketh 110 li. and so he gaineth after 10 li. vpon the 100, which is the $\frac{1}{10}$ of his principall, & the other which buyeth wares for 110 li. that cost the other but 100 li. of the 110 li. he maketh but 100 li. & therfore say by the rule of 3. if 110 become 100, how much shall 100 become? Multiply and diuide, and you shall find 90 $\frac{10}{11}$. the which abate from 100 and there will remaine 9 $\frac{1}{11}$ which is the $\frac{1}{11}$ of the principall that the secōd looseth in the 100 li. as before is sayd. And therefore, who so that will know what one Marchant gaineth of another, either after the rate of 10 pound vppon the 100 li. which is the $\frac{1}{10}$ of his principall, or else after the rate of 20 li. vppon the 100 li. which is the $\frac{1}{5}$, or of any other part, and that hee would like-

likewise know what part the other loseth of his principall, he must take for the numerator of the broken number of him that loseth, as much as for him that giueth, then adde the Numerator and the Denominator (of the broken Number of him that gaineth) both together, and make thereof the Denominator of the broken Number of him that loseth, & then shal you haue the iust part of him that loseth: as by example, of him that gaineth after 10 li. vppon the 100 li. which is the $\frac{1}{10}$ of his principall: take the numerator of $\frac{1}{10}$ which is 1, and make that the Numerator of the broken number of him that loseth, then adde 1, which is the numerator of the Fraction of him that gaineth with 10, which is his denominator, and you shall haue 11 for the denominator of the fraction of him that loseth. Then put 1 ouer the 11 and so you shall haue $\frac{1}{11}$. Thus it appeareth when one Marchant gaineth of another after 10 li. vpon the 100 li. he gaineth the $\frac{1}{10}$ of his principall, and the

other

other loseth $9\frac{1}{11}$, which is the $\frac{1}{11}$ of his principall. And if hee would gaine after 20 vpon the 100 li. which is the $\frac{1}{5}$ of his principall, the other should lose $16\frac{2}{3}$, which is the $\frac{1}{6}$ of his principall, and so is to be vnderstood of all other Fractions.

4 Two Marchants will change their Marchandize, the one with the other, the one of them hath Sayes of 20 s. and 10 d. the peece to sell for readie money: and in barter he will sell the peece for 23 s. 4 d. and yet hee will gaine moreouer, after 10 pound vppon the 100 pound. The other hath wooll of 50 s. the 100 waight to sell for ready money. I demaund how he shall sell C. of wooll in barter? Ans. Say, if 20 s. 10 d. which is the iust price of the peece of Say, bee sould in barter for 23 s. 4 d. for how much shall 50 s. (which is the iust price of the hundred of wooll) be sold in barter? multiply & diuide, and you shall find 56 s. Then for because ẏ first marchant wil gaine

after

after 10 li. vppon the 100 li. he maketh of his 100 pound. 110 pound, ſo the ſecond Marchant maketh of 110 li. but 100 li. And therefore ſay by the rule of thrée, if the ſecond marchant of 110 do make but 100, how much ſhal he make of 56? Multiply and diuide, and you ſhall finde 50 ſ. 10 d. $\frac{10}{11}$ of a peny, and for ſo much ſhal he ſell the Hundred of Wooll in barter.

5 More, two marchants will change their marchandize the one with the other, the one of them hath Taffeta of 16 crownes the péece, to ſell for readie money, and in barter he will ſell the péece for 20 crownes, and yet hee will gayne moreouer after the rate of ten pound vpon the 100 li. The other hath Ginger of 3 ſ. 9 d. the pound waight, to ſell in barter. I demand what the pound did coſt in readie money? Anſ. Say if 20 crowns which is the ſurprice of the péece of Taffeta, become of 16 Crownes the iuſt price, of how much ſhall come 3 ſ. 9 d. which is ỹ ſurprice

of the pound of Ginger? Multiplie and divide, and you shall finde 3 shil. Then, for because that the marchant of Taffeta will gaine after the rate of 10 vppon the 100: Say if 100 doe giue 110: what will 3 s. giue? Multiply and divide, and you shal finde 3 s. 3 d. $\frac{1}{3}$, and so much did the Pound of Ginger cost in ready money.

6 More, two marchants wil change their marchandize, the one with the other, the one of them hath Worsteds of 25 s. the peece to sel for ready mony, and in barter hee will sell the peece for 33 s. 4 d. and yet he looseth after 10 li. in the 100 li. the other hath Ware of 3 li. 6 s. 8 d. the 100 waight to sell for ready money. I would know for what price hee should sel his Ware in barter? Ans. Say if 25 s. which is the iust price of the peece of Worsted, be sould in barter for 33 s. 4 d. for how much shal 3 pound 6 s. 8 d. bee sould? which is the iust price of the 100 of ware, as it was worth in ready money

ney. Multiply and diuide and you shall finde 4 li. $\frac{4}{9}$ which is 8 s. 10 d. $\frac{2}{3}$, then for because that the marchant of worsteds, loseth after 10 li. in the 100 li. of 100 li. hee maketh but 90, and therfore say, if 90 giue 100, what giueth 4 pound $\frac{4}{9}$? Multiply and diuide, and you shall finde 4 li. $\frac{78}{81}$, which is worth 18 s. 9 d. $\frac{1}{27}$ and for so much shall hee sel the 100 pound waight of Ware in Barter.

7 More, Two Marchants will change their Marchandize the one with the other: the one of them hath Worsteds of 5 li. 6 s. 8 d. the peece to sel for ready money, and in Barter he will sell the peece for 6 l. 13 s. 4 d. and yet hee loseth after 10 li. in the 100. & the other hath Muske of 2 s. 9 d. $\frac{1}{3}$ the pound waight to sell in Barter. I demaund what the pound did cost in ready money? Answere. Say if 6 li. $\frac{2}{3}$ which is the ouer-price of the peece of Worsted, become of 5 li. $\frac{1}{3}$, which is the iust price of the same, of how much

shall come 2 s. 9 d. $\frac{1}{3}$. Multiply and diuide, and you shal find 2 s. $\frac{1}{3}$ which $\frac{1}{3}$ is 2 d. $\frac{2}{3}$: then for because that ẏ marchant of Worsteds losеth after 10 li. in the 100 li. of a 100 hee maketh but 90: and therefore say, if 100 giue but 90, how much shal 2 s. $\frac{1}{3}$ giue? Multiply and diuide and you shall find 2 shil. and so much cost the pound of Muske in ready mony.

Other Rules in Barter wherein is giuen some part in ready mony.

WHen a Marchant ouerselleth his marchandize, and he will haue also some part of his ouer-price in readie Money: as the $\frac{1}{2}$, the $\frac{1}{3}$, or the $\frac{1}{4}$, &c. He must substract the same part of money from the iust price, and also from the ouer-price of his Marchandize: and the two Numbers that remain after the substraction is made shall bee the two first numbers in the rule of thrée: and the iust price of the Second Marchant shall bee the third number

number: to know how much hee shall ouersell the part of his marchandize.

Example.

8 Two Marchants will change their marchandize the one with the other, the one of them hath fine Wooll at 50 li. the 100 li. waight, to sell for ready money, and in barter he wil sel it for 6 li. and yet hee will haue the $\frac{1}{3}$ in ready money. The other hath cloth of 13 s. 4 d. the yarde to sell for ready Money. I would know how hee shall sell the same in barter? An. Take the $\frac{1}{3}$ of 6 li. which is the ouer price of the 100 of wooll, and that is 2 li. the which you must abate from 5 li. which is the iust price of the C of wool, & also abate it from 6 li. which is the ouerprice, and there shal rest 3 li. and 4 li. for the two first numbers in the rule of thrée; then take 13 s. 4 d. which is the iust price of a yarde of cloath, for the third number: Then multiply & diuide, and you shall find 17 s. 9 d. $\frac{1}{3}$, for so much shall

the second sell his cloth in barter.

9 More, two marchants wil change their marchandize the one with the other, the one of them hath ware of 3 l. 6 s. 8 d. the C. to sel for ready money, and in Barter hee wil sel the same for 4 l. 3 s. 4 d. and yet hee will haue the $\frac{1}{4}$ in ready money: and the other, hath fine Crimson Satten of 15 s. the yard to sell in barter. I demand what it is worth in ready money? Answ. Take the $\frac{1}{4}$ of 4 l. 3 s. 4 d. which is 1 li. 0 s. 10 d. and abate it from 4 li. 3 s. 4 d. & also from 3 li. 6 s. 8 d. & there resteth 3 li. 2 s. 6 d. and 2 li. 5 s. 10 pence, for the two first Numbers in the Rule of three. And 15 s. for the third Number which 15 shil. is the ouer-price of the yard of Satten. Then Multiplie and diuide and you shal finde 11 shil. And so much did the yard of Satten cost in ready money.

10 Two Marchants will change their marchandize the one with the o-

ther

ther: the one of them hath Tinne of 50 s. the C. waight, to sell for ready money, and in barter he wil sell it for 3 li. 6 s. 8 d. and hee will gaine after 10 li. vpon the 100 l. and yet hee will haue also the one halfe in ready mony. The other hath Leade of 3 halfe pence the li. to sell for ready money. I demand how hee shal sel the li. of leade in barter? Ans. Sée first at 10 li. vpon the 100 li. what the 3 li. $\frac{1}{3}$ will come vnto, in saying by the Rule of 3, if 100 giue 110, what will $3\frac{1}{3}$ giue? Multiply and diuide and you shal find that they wil come to 3 pound $\frac{2}{3}$, which is 13 s. 4 d. of the which, y^e halfe which hee demaundeth in ready money, is 36 shil. 8 d. the same beeing abated from 50 s. and also from 3 li. 13 s. 4 d. there will remaine 13 s. 4 d. and 1 li. 16 s. 8 d. for the two first Numbers in the Rule of Thrée, which you must put al into halfe-pence, and the foresaid thrée halfe-pence shal bée the third number, and then multiply and diuide, and you shall finde 4 d. $\frac{1}{5}$, and for so much shal

 hee

he sell the 1 li. of Leade in barter.

11 More, Two Marchants will change their marchandize the one with the other: the one of them hath steele of 16 s. 8 d. the 100 li. waight, to sell for ready money, and in barter he wil sell it for 25 s. and yet hee loseth after 10 li. in the 100 li. but hee will haue the $\frac{1}{2}$ in ready money: the other hath yron of 6 s. 8 d. the hundred to sell in barter. I demaund what the hundred of yron did cost in ready money? *Ans.* Say if 100 come but to 90, how much shall 25 s. come to? Multiplie and diuide, and you shal finde 22 s. 6 d. of the which number, take the $\frac{1}{2}$ which is 11 s. 3 d. and substract it from 22 s 6 d. and also from 16 s. 8 d. and there wil remain 11 s. 3 d. and 5 s. 5 d. for the 2 first numbers in the rule of 3, and 6 s. 8 d. which is the ouer-price of a hundred of yron for the third number: then multiply and diuide, and you shal find 3 s. 2 d. $\frac{14}{37}$: and so much did the hundred of yron cost in ready money.

12

12 More, two marchants wil change their marchandize the one with the other: the one of them hath sayes of 20 s. 10 d. the peece to sell for ready money, and in barter he wil sell the peece for 25 s. and he wil haue that $\frac{1}{4}$ in ready money. The other hath caps of 35 s the dozen, to sell for ready mony, but hee will gaine after the rate of 10 li. vppon the 100 li. I demand how hee shal sel a dozen of caps in barter?

Answere. Say if 100 be worth 110. What shall 35 s. bee worth, which is the iust price of the dozen of caps? multiply and diuide, and you shal finde 38 shi. 6 d. Then take the $\frac{1}{4}$ of 25 s. which is 6 s. 3 d. and substract it from 20 s. 10 d. and also from 25 s. and there wil remaine 14 s. 7 d. and 18 s. 9 d. for the 2 first numbers in the rule of 3, and 38 s. 6 d. which is the iust price with his gaine in the Dozen of caps for the third number: then multiply and diuide, and you shall find 49 s. 6 d. and for so much hee shall sell the Dozen of caps in barter.

The

Chap. 12.

Of Exchanging of money from one place to another.

FIrst you must note, that at Antwerp they vse to make their accounts by Deniers de gros, that is to say, by pence Flemmish, whereof 12 do make 1 s. Flemish, and 20 Flemish do make 1 li. de gros.

Example.

1 If I deliuer in Flaunders 500 li. Flemmish at 19 s. 6 d. de gros, that is to say at 19 s. 6 d. Flemish, to receiue 20 s. at London. I demand how much I shall receiue sterling at London for the sayd 500 pound Flemmish? Answere. Say if $19\frac{1}{2}$ giue $\frac{20}{1}$, what wil $\frac{500}{1}$ giue? Multiply and diuide, and you shal finde 512 pound. 16 s. 4 d. $\frac{12}{13}$ of a penny. And so much sterling shall I receiue in London for my 500 pound Flemmish.

2 If I deliuer in London 375 li. sterling, to receiue in Antwerpe 21 s. 9 d. the grosse, that is to say, Flemish for euery pound sterling. I demaund how many Poundes Flemmish I shal receiue in Antwerpe for the sayd 375 l. sterling? Ansȝw. Say if $\frac{20}{1}$ giue $21\frac{3}{4}$ what wil $\frac{375}{1}$ giue? multiply & diuide, and you shall find 407 li. 16 s. 3 d. So mans pounds Flemish shall I receiue in Antwerpe for the sayd 375 li. ster. deliuered in London.

3 If I take vp money at Antwerpe after 19 s. 6 d. Flemish, to pay for the same at London 20 s. ster. and when the day of payment is come, I am forced to returne the same, and to take vp Money agayne in London to pay my bil of exchange, so that for 20 s. which I take vp heere, I must pay 19 s. 9 d. at Antwerpe. I demaund whether I doe winne or lose, and how much in, or vpon the 100 li. of money? Ans. Say, if $19\frac{3}{4}$ giue $19\frac{1}{2}$, what will $\frac{100}{1}$ giue? multiply and diuide and you shal

find

finde 98 $\frac{58}{73}$, the which béeing abated from 100, there will remaine 1, $\frac{21}{73}$. And ſo much doe I loſe vppon the 100 pound of money.

4 If I take vp at London 20 li. ſterling to pay at Antwarp 21 li. 8 ß. Flemiſh; and when the day of payment is come, my Factor is conſtrained to take vp Money againe at Antwarpe, wherewith to pay the foreſaid ſumme and there hee doth receiue 22 li. Flemiſh, for the which I muſt pay 20 li. at London. Now I demand whether I doe win or loſe, and how much vpon the 100 li. of Mony after the rate? Anſ. Say if 21 $\frac{2}{3}$ giue $\frac{22}{1}$. What will $\frac{100}{1}$ giue? Multiplie and diuide, and you ſhall finde 101 $\frac{7}{13}$, from the which abate 100, and there will remaine 1 $\frac{7}{13}$ and ſo much ſhal I gaine vpon the 100 pound of money.

The Exchange from London into France, is not like as it is in Flanders, but is deliuered by the French

Crowne

Crowne, which is worth 50 Souse Tournois the péece.

And héere you must note, that in Fraunce they make their account by Deniers Tournois, whereof 12 Deniers maketh 1 Souse Tournois, and 20 souse tournois maketh 1 li. Tournois, which they cal a Liure or Franc, and the French Crowne is currant among marchants for 51 Souse Tournois, but by exchange it is otherwise, for they will deliuer but 50 souse tournois, which is 2 li. 10 souse Tournois for a Crowne, and at such price the Crowne, as the taker vp of mony can agrée with the deliuerer. *Note.*

Example.

5 If I deliuer 340 li. ster. héere in London, after 6 s. 4 d. sterling the Crowne, to receiue at Roan, or at Paris 50 Souse Tournois for euery Crowne, I would know how many Liures Tournois, I shall receiue there for my 340 li. ster? Answ. Say

it

if 6 s. $\frac{1}{3}$ ster. doe giue me 2 l. $\frac{1}{5}$. Tournois, what will $\frac{6800}{1}$ s. giue, (which is the 340 li. reduced into Shillinges.) Then multiply and diuide, and you shal find 2684 Liures, $\frac{4}{19}$ which is worth 4 souse $\frac{4}{19}$ Tournois, and so much shal I receiue in Roan or Paris for my 340 l. sterling.

6 If I deliuer in Paris or Roan, or elsewhere in Fraunce 1250 Liures Tournois, at 50 souse Tournois the Crowne, to receiue for euery such Crowne 6 s. 3 d. sterling in London. I demaund how much sterling mony I shall receiue at London for my 1250 pound tournois? Ans. Say, if 2 l. $\frac{1}{2}$. doe giue mee 6 shil. $\frac{1}{4}$, what will $\frac{1250}{1}$ giue? Multiply and diuide, and you shal finde 3125 s. sterling. And so many poundes shall I receiue at London for the sayde 1250 Liures Tournois, after 6 s. 3 d. for euery Crowne of 50 soulze.

The

Chap. 13.
Of the Rule of Alligation, or Mixture.

The Rule of Alligation is so named for that it teacheth to alligate or binde together diuers parcels of sundry prices, and to know how much you shal take of euery parcel, according to the numbers of the question the which Rule is distinct into two parts: as followeth.

The first part of the rule of alligation sheweth how to make a myxture of diuers thyngs béeing of sundry prices: And of the same things so mixed, to know the common price of the sayd mixture.

Example.

1 A man would mixe 5 bushels of Wheat at 2 s. 8 d. the bushel, with 9 bushels of Rye, at 2 s. the bushel, and woulde knowe how much the Bushell

so

if 6 s. $\frac{1}{3}$ ster. doe giue me 2 l. $\frac{1}{2}$. Tournois, what will $\frac{6800}{1}$ s. giue, (which is the 340 li. reduced into Shillinges.) Then multiply and diuide, and you shal find 2684 Liures, $\frac{4}{19}$ which is worth 4 souse $\frac{4}{19}$ Tournois, and so much shal I receiue in Roan or Paris for my 340 l. sterling.

6 If I deliuer in Paris or Roan, or elsewhere in Fraunce 1250 Liures Tournois, at 50 souse Tournois the Crowne, to receiue for euery such Crowne 6 s. 3 d. sterling in London. I demaund how much sterling mony I shall receiue at London for my 1250 pound tournois? Ans. Say, if 2 l. $\frac{1}{2}$. doe giue mee 6 shil. $\frac{1}{4}$, what will $\frac{1250}{1}$ giue? Multiply and diuide, and you shal finde 3125 s. sterling. And so many poundes shall I receiue at London for the sayde 1250 Liures Tournois, after 6 s. 3 d. for euery Crowne of 50 soulze.

The

Chap. 13.
Of the Rule of Alligation, or Mixture.

THe Rule of Alligation is ſo named for that it teacheth to alligate or binde together diuers parcels of ſundry prices, and to know how much you ſhal take of euery parcel, according to the numbers of the queſtion the which Rule is diſtinct into two parts: as followeth.

The firſt part of the rule of alligation ſheweth how to make a mixture of diuers thyngs béeing of ſundry prices: And of the ſame things ſo mixed, to know the common price of the ſayd mixture.

Example.

1 A man would mixe 5 buſhels of Wheat at 2 s. 8 d. the buſhel, with 9 buſhels of Rye, at 2 s. the buſhel, and woulde knowe how much the Buſhell

ſo

so mixed doth stand him in, the one with the other? Answere. For to know the same common price. You must multiply euery thing by his price and adde all the products together: the which you must diuide by the number of all the thinges that are to bee mixed, and the quotient will answere to the question, as in the foresaid example, I multiplie fiue Bushels by his price, that is to say, by 2 s. 8 d. and thereof commeth 13 s. 4 d. Likewise I multiply 9 bushels by 2 s. maketh 18 s. both these summes added together, doe make 31 s. 4 d. the which I doe reduce into pence: and they make 376 d. Then I diuide 376 by 14 which is the number of all the bushels, & my quotient wilbe 26 pence and $\frac{6}{7}$, and so much doth one bushel of both the sorts of graine stand him in.

2 If you haue two seuerall things, whereof you woulde mixe equall portions together, you must adde their prices & take onely the $\frac{1}{2}$, if you would mixe

mixe togither equall portions of thrée thinges, you must take $\frac{1}{3}$, and of 4 the $\frac{1}{4}$ and so continuing, as by Example: Wheat of 2 s. 8 d. the bushel, and Rie of 2 s. the Bushell béeing mingled by equall portions, I adde 2 s. 8 pence and 2 s. together, & they make 4 s. 8 d. whereof the one $\frac{1}{2}$ is 2 s. 4 d. and so much is the value of one Bushell of such a mixture. And if there were a portion of barley at 20 d. then I must adde 2 s. 8 d. 2 s. & 20 d. togither, and they make 6 s. 4 d. whereof the $\frac{1}{3}$ which is 2 s. 1 d. $\frac{1}{3}$ should bee the price of one bushell of that mixture.

3 A marchant hath 27 li. waight of large Cloues at 6 s. the li. 15 li. of the middle sort at 2 s. 6 d. the li. And 10 li. of Fuste at 2 s. 2 d. the li. when al that same are mixed together, I would know how much the li. is worth?

Answere. You must multiply euery drug by his price, and then diuide the totall summe of the products, by the whole waight of the drugs, and you

shal find 51 d. $\frac{1}{18}$ and so much is the li. of that mixture worth.

27	at	6 s. 0 d.	162
15	at	2 s. 6 d.	37 $\frac{1}{2}$.
10	at	2 s. 2 d.	21 $\frac{2}{3}$.
52			221 $\frac{1}{6}$.

4 And if you would mixe $\frac{1}{2}$ large cloues, $\frac{1}{3}$ of middle, and $\frac{1}{4}$ of Fust, and you would know how much the pound waight were worth, you must take a number which containeth those parts, as for Example 12, whereof the $\frac{1}{2}$, which is 6, shal signifie so many pound of large cloues: The $\frac{1}{3}$ which is 4, shall be so many li. of middle, and the $\frac{1}{4}$ which is 3, shal be so many li. of Fust Then afterwardes you must multiply euery drog by his price, and diuide the totall Sum of all the products, by the whole sum of the droogs, and you shal find 4 s. $\frac{1}{18}$. And so much is 1 pound waight of the mixture.

6 at 6 s. 0 d.	36
4 at 2 s. 6 d.	10
3 at 2 s. 2 d.	06 $\frac{1}{2}$
13	52 $\frac{1}{2}$.

5 And if you would make 100 Li. waight of such a mixture, you shall worke by the rule of company and you shall finde 46 Li. $\frac{2}{13}$ of large cloues, 30 Li. $\frac{10}{13}$ of middle. And 23 $\frac{1}{13}$ of Fust.

$$\begin{array}{r|l}
6 & \\
4 & 13. \quad 100 \left\{ \begin{array}{l} 6 \therefore \textit{Ans.}\ 46\frac{2}{13} \\ 4 \therefore \textit{Ans.}\ 30\frac{10}{13} \\ 3 \therefore \textit{Ans.}\ 23\frac{1}{13} \end{array} \right. \\
\underline{3} & \\
13 & \qquad\qquad\qquad 100
\end{array}$$

6 A Goldsmith hath 8 Li. waight of siluer billion of 7 ounces fine, more 15 Li. of 8 ounces $\frac{1}{2}$ fine, & 13 Li. waight of 10 ounces fine, and hee will melt all these together, and make of them one masse. The Question is to know of what finenesse the pound waight is? Answer. You must multiply the number of the waights of euery billion by his finesse, and therof will come the

 ounces

ounces and partes of ounces fine, the which you must ad together, and they will make 313 Ounces ½ of fine, the same you must diuide by 36 which is the whole summe of the pound waight of Billion, and you shal find 8 ounces and $\frac{11}{72}$ remayning, which $\frac{11}{72}$ partes of an ounce is worth 17 penny waight & 4 graines, and so much is the l. waight of this mixture worth.

8 Lib.	at	7 onz.	is	56
15	at	8 onz. ½	is	127 ½
13	at	10 onz.	is	130
36.				313 ½.

7 A Goldsmith hath 3 sorts of Silver Byllion, that is to say, 5 li. 7 ounces 10 peny waight, at 7 ounces ½ fine: 12 li. 3 ounces, at 6 ounces ⅓ fine And 4 l. at 9 ounces fine. All the which he will melt into one masse. The question is to know, of what finenesse the pound waight of that mixture shal be? Ans. You must multiply euery Byllion by his finesse, as afore. And adde together

together all the products, and they do amount to 155 li. $\frac{37}{48}$. Then adde all the waights of the Byllions together into one ſumme, and they make 21 li. $\frac{7}{8}$, diuide then 155 $\frac{37}{48}$, by 21 $\frac{7}{8}$, and your quotient will bee 7 Ounces and $\frac{1016}{8400}$ remayning, the which $\frac{1016}{1400}$, being brought into penny waights and graines, doe make 2 penny waights 10 graines $\frac{2}{35}$, of a graine fine. So you may perceiue that the ſame mixture is of 7 ounces 2 d. 10 graines, and $\frac{2}{35}$ of a graine fine, the pound waight.

And héere is to bee noted, that the reckoning of the waights of Siluer is as followeth, that is to ſay,

1 li. of Troy waight, maketh 12 Ounce.

1 Ounce is diuided in 20 pennies waight.

1 Penny waight is diſtributed into 24 graines.

1 Graine into 20 ſmaller parts, &c.

And the reckoning for Gold, is thus,

 one

1 Ounce of fine Gould without any alloy, is imagined to be 24 karets.

1 Karet is diuided into 4 graines.

1 Grain is parted into 2 halfe grains or 4 quarters of a graine, &c.

And so into other smaller parts.

8 But if the said Goldsmith would put 5 pound waight of copper with the sayd Byllions, and you would know of what finesse it is, then you must ad the same 5 Li. with the 21 Li. $\frac{7}{8}$, and it maketh 26 $\frac{7}{8}$. Then diuide the aforesayd 155 pound $\frac{37}{48}$, by 26 pound $\frac{7}{8}$, and you shall finde 5 ounces fine, and $\frac{821}{1032}$ remayning, the which $\frac{8416}{1032}$ is worth 15 penny waight, 22 graines and $\frac{4}{47}$. And of that finesse wil the same masse bee.

9 A Goldsmith hath melted 12 Li. waight, and 5 Ounces of Gold Billion, bėing of 18 Karets fine, with 4 Li. waight, 4 Ounces and $\frac{1}{2}$, at 21 Karets fine, I demaund of what finesse is 1 Li. waight of the same masse? An.

You

You must multiplie the waights (by the karets fine) of each sort and ad ÿ products together, the same you must diuide by the whole Summe of all the waights added together, and your quotient wil shew you of what finesse the same is of, as in the former example, I doe multiply 12 li. & 5 Ounces by 18 Karets, and thereof commeth 223 karets $\frac{1}{2}$. Likewise I doe multiply 4 li. waight, 4 ounces $\frac{1}{2}$, by 21 karets, and thereof commeth 91 Karets $\frac{7}{8}$, these two Summes of Karetts I doe adde together, and they make 315 Karetts $\frac{3}{8}$. Then I doe adde 12 pound waight, 5 ounces, and 4 li. waight 4 ounces and $\frac{1}{2}$ together, and they make 16 li. 9 ounces $\frac{1}{2}$, the which 9 ounces $\frac{1}{2}$ are $\frac{19}{24}$ parts of a pound: and therefore I diuide 315 $\frac{3}{8}$ by 16 li. $\frac{19}{24}$, and thereof cometh 18 karets, and $\frac{2520}{3224}$ remayning which fraction is 3 graines, & $\frac{51}{403}$ parts of a grayne. And of that finesse is 1 li. waight of the sayd masse.

A Goldsmith hath melted 10 pound waight, 7 ounces, and $\frac{1}{4}$ of 20 Karets,

 and

and $\frac{1}{3}$ fine. And 8 Li. waight, 2 ounces and $\frac{5}{8}$ parts of 23 karets fine, with 15 l. waight, 1 ounce of Siluer. The question is, of what finenes is the pound waight of the sayd masse? Ans. You must multiply ÿ waight of euery sort of Gold Byllion by his allay, that is to say, by his finenesse, and adde all the products together, and you shall finde 340 karets $\frac{25}{432}$, then adde the waght of the two sorts of Gold billion, with the waight of the Siluer together, and thereof will come 33 Li. 11 ounces, $\frac{5}{24}$ the which 11 ounces $\frac{5}{24}$ is $\frac{169}{288}$ of a poūd waight, then diuide the said 340 karets $\frac{25}{432}$ parts by 33 pounds $\frac{269}{288}$. And you shall finde 10 Karets $\frac{4205}{283871}$. And of the same finesse shal the pound waight of that masse of Gold be.

The second part of the rule of Alligation.

1 A Goldsmith hath 4 sorts of gold, The first is worth 30 Crownes the pound waight, the second is worth 36 Crownes,

Crownes, and the third is worth 42 Crownes, and the fourth is worth 45 Crownes, and of these 4 sorts hee wil make a Scepter of 6 Pound waight, which shall be worth 40 Crownes the Pound. I demaunde how much hee must take of euery sort. Answ. First you must set downe the nũbers wherof you wil make the alligation (which are 30, 36, 42, and 45) orderly the one vnder the other, after the same maner as if you would adde them together: and the common Number whereunto you will reduce them, you shall set on the left hand, which common number in this example is 40. Then marke which of the said foure Numbers, are lesser, then that common number, and which of them bee greater, and with a draught of your pen, euermore linke two numbers together, so that the one bée lesser than the common number, & the other greater then it, for two greater, nor two smaller Numbers may not bee linked together, for they will either be lesser, or els greater then the com-

common number but one greater nũber, and one smaller may bée so mixed that they will make the common number. And two greater or two smaller numbers can neuer make the common Number in due order, as héereafter shall appeare.

After that you haue thus linked them, then marke how much each of the lesser Numbers is smaller then the common number, and that difference you shall set against the greater numbers which bee linked with those smaller, each of them with his match still on the right hand. And likewise, you must set the excesse of the greater nũbers against the lesser, which be combined with them. Then shall you ad all those differences into one summe, which shall bee the first number in the Rule of thrée, and the second number shall be the whole massy péece that you will haue of all the particulars, which in this Example was presupposed to be 6 li. Then the third summe shalbée each difference by it selfe, and by them

shall you finde out the fourth Number declaring the iust portion that you shal take of euery particular in that mixture, as now by the following example I will make it more plaine.

	The prices seuerall.	*The differences.*	
The common price 40 *or number.*	30	5	*A*
	36	2	*B*
	42	4	*C*
	45	10	*D*
		21	

21. 6. 5. | | 21. 6. 2.

21. 6. 4. | | 21. 6. 10.

Heere in this former example, you see that I haue set downe the seuerall prices, which be 30, 26, 42, 45, and haue linked together 30, with 45, and 36, with 42. The common price 40. I haue set on the left side, as before is declared, and the difference of it from

euery

euery seuerall price, I haue set on the right hand against that Summe with the which it is linked. So the difference of 30, from 40, is 10, which I set against 45, that hee is linked withall; and the difference of 45, aboue 40 is 5, which I haue set against 30. So likewise, the difference of 42, aboue 40, is 2, that I haue set against 36. And the difference betweene 36 and 40 which is 4 I haue set against 42. Then I adde all these differences together, namely 5, 2, 4, and 10, and they make 21, which I make the first number in the rule of three, and 6 li. which is the waight of the Scepter of Gold the second Number, and the third Number shall be euery particular difference for euery seuerall working. Then worke by the rule of three, saying if 21 (which is all the differences added together) doe giue mee 6 pound waight, which is the waight of the Scepter, what shall 5 giue, which is the first difference?

I multiply and diuide, and I find 1

li. waight $\frac{3}{7}$, so much must I haue of the first price. Thē I do in like maner with the rest, & I find $\frac{4}{7}$ of a li. waight of the second price, 1 li. $\frac{3}{7}$ of the third price: & 2 li. $\frac{6}{7}$ of the fourth, the which 4 summes béeing added together, doe make 6 li. which is the whole waight of the Scepter that I wold haue. And now to proue if the peeces doe agrée, you shall doe thus: First multiply this totall Summe 6 by the common price 40, and it will make 240 Crownes, which you shall kéepe by it selfe. And afterward multiply euery seuerall Summe of waight by the price belonging to the same waight, and if that sum doe agree with the first that you kept by it selfe, then is your work wel done, as héere 1 li. $\frac{3}{7}$, is the waight of the sort of gold which is of 30 crownes price. Therefore multiply 30 by 1 li. $\frac{3}{7}$, and it maketh 42 crownes $\frac{6}{7}$, which you must set downe. The multiplie $\frac{4}{7}$ (which is the waight of the Second sort of Gould) by 36 which is the price of the same, and thereof cometh

20 crowns $\frac{4}{7}$: so againe 1 li. $\frac{1}{7}$, multiplyed by 42 Crownes, which is the third price, doth make 48 Crownes. And last of all 2 li. $\frac{4}{7}$ multiplyed by 45 maketh 128 Crownes $\frac{4}{7}$. All these being added together, doth make 240 crownes agreeable to the former sum of 40, multiplyed by 6. And thus I may affirme that this worke is well done.

2 A Tauerner hath foure sorts of wine of foure seuerall prices, the first of 8 pence the Gallond, the second of 10 pence the gallond, the third of 15 pence, and the fourth of 18 pence. And hee will mixe all these sorts together, so that the gallond shall bee worth but 12 pence. I demand how many Gallonds he must take of euery sort? An. First suppose the punchen to hold some certayn measure, as to contayn 84 gallonds, and then the forme will bee after this sort, as you see hereafter following.

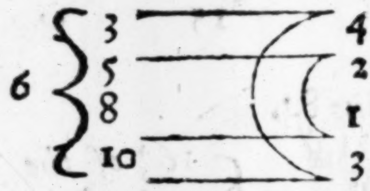
12	8	3	
	10	6	
	15	4	
	18	2	
		15	

If 15 *doe giue* 84.

What will 3	*giue?*	$16\frac{4}{5}$	*of the* 1.
What will 6	*They*	$33\frac{3}{5}$	*of the* 2.
What will 4	*make*	$22\frac{2}{5}$	*of the* 3.
What will 2		$11\frac{1}{5}$	*of the* 4.
		84	

3 A mint-master hath foure sorts of Siluer Billion of these finesse following. The first is of 3 ounces fine, the second of 5 ounces fine, the third of 8 ounces fine, and the fourth of 10 ounce fine. And of all these 4 sorts, he would make another sort, that should be but of 6 ounces fine. The question is to know what portion he must take of euery the said billions? An. Set downe the particular fines, the one vnder the other, namely 3, 5, 8, and 10, and set 6 which

which is the common finenes, befoꝛe them toward your left hand, as héere you may ſée.



Then put the difference of 6 from 3 right againſt 10, and the difference of 6 from 10, which is 4, right againſt 3 Likewiſe the difference of 5 from 6 which is 1, right againſt 8, and the difference of 6 from 8, which is 2 right againſt 5. This done, you ſhall conclude, that foꝛ euery 4 li. waight that hee taketh of the byllion of 3 Ounces fine, hee muſt take 2 li. of the billion of 5 ounces fine, and 1 li. waight of the billion of 8 ounces fine, & 3 li. waight of that which is of 10 ounces fine. Oꝛ els if you pleaſe ad 4, 2, 1, and 3 together and they make 10, which ſhall bee the denominatoꝛ of euery of the poꝛtions

that

that is to say, you shall take $\frac{4}{10}$ of the Billion of 3 ounc. fine $\frac{2}{10}$ of that which is of 5 ounces fine $\frac{1}{10}$ of that of 8 ounce fine, and $\frac{3}{10}$ of that which is of 10 ounces fine. And so of all such like. And if you would make 60 li. waight of such a mixture, you must adde 4, 2, 1, & 3, togither, which maketh 10, and then worke by the rule of company saying if 10 li. giue 60 li. what will 4 giue? and so likewise, what will 4 giue, &c. This forme may bee varyed, by combining the particular values after this manner as heere you doe see, and as in the other example, it is playne.

4 Sometimes the value doth change his difference, and is linked vnto diuers, for to represent the portion that is to be taken of euery thing, as by ex-

ample. A marchant hath wheat of 2 s 8 d. the bushell. Rie of 2 s. and barley of 16 d. the bushell, and hee will make a mixture of these sortes which shall stand him but in 22 pence the bushell. It is demaunded how much hee may take of euery sort of the sayd graine. Ans. Put the difference of 22 from 32, and 24, right against the 16. And likewise the difference of 16 from 22 right against 32 and against 24: And you shall finde for 6 bushels that hee taketh of wheate, hee must take 6 bushels of Rie, and 12 bushels of Barley.

d.

	32	6
22	24	6
	16	10, and 2, or 12.

5. A Mint master hath billion of 9 Ounces 10 penny waight fine, and of the same he would make mony, which should be but of 6 ounc. fine, and therfore it behoueth him to melt copper

there-

therewith which is valued at 0 penny waight of fine. The Question is to know how much Siluer and copper he must mixe together? After that you haue put downe 9 ounces $\frac{1}{2}$ for the value of the Siluer, and right vnder the same 0 for the Copper, you must take the difference of 6 from 9 $\frac{1}{2}$ which is 3 $\frac{1}{2}$, and place the same summe right against the 0, for to signifie the portiō of copper that he must take: And the difference of 0 frō 6, is 6; the same you must set right against 9 $\frac{1}{2}$, which shall represent the portion of siluer that hee must take. And thus you see, that for 6 L. of siluer that he taketh hee must take 3 Li. $\frac{1}{2}$ of copper to make the sayd money of 6 ounces fine.

$$6\left\{\begin{array}{c} 9\frac{1}{2} \\ \\ 0 \end{array}\right\}\begin{array}{l} 6 \text{ Li. sil.} \\ \\ 3 \text{ Li. } \frac{1}{2} \text{ cop.} \end{array}$$

And if hee had 3. sorts of Siluer Billion, that is to say of 6 ounces fine: of 7 ounces fine, and of 9 ounces fine, and hee woulde make Money thereof

which ſhould bee but of 5 ounces fine, it bęhoooueth him to mixe copper ther-with. And this forme following doth ſhew how the ſame muſt be combined and likewiſe how much hee muſt take of euery ſort.

5	6	—	5
	7	—	5
	9	—	5
	0	—	1, 2, 4, all is 7.

6 Likewiſe, a Mint maſter hath bil-lion of Gold, at 19 karets fine, ſome at 22 Karetts fine, ſome at 24 Karets which is full fine without corrupti-on, and hee wil make coyne thereof, which ſhall bee 23 karets fine, it is de-maunded how much hee muſt take of euery ſort? Anſwere. make your Al-ligation as in this forme héereunder ſheweth.

23	19	—	1
	22	—	1
	24	—	4, 1, all is 5.

More, the sayd master hath Gold of 20 karets ½ fine, and of 22 karets fine, and he wil allay the same to 18 karets fine. And for to doe the same, it is convenient for him to mixe Siluer therewith, which is esteemed at 0 karetts fine, but proceeding according to this Rule, he should find that for 18 pound waight, or other portions that hee taketh of the two sorts of billion of gold, hee must take 6 pound waight, and ½ of siluer to allay the same vnto 18 Karets fine.

$$18\left\{\begin{array}{lll} 20\frac{1}{2} & \text{———————} & 18 \\ 22 & \text{———————} & 18 \\ 0 & \text{———————} & 2,\frac{1}{2}\ 4,\ \text{that is } 6\frac{1}{2}. \end{array}\right.$$

7 Agayne the said Master hath 100 Pound waight of Gould at 22 karets fine, and 20 pound waight at 19 karets fine, the which he will allay to 20 karets fine. The question is whether hee ought to mixe any siluer with the same, yea or no, and how much?

Answer. You must consider (by the first part of the rule of alligation) the allay of the 100 li. and of the 20 li. being melted together, and you shal find that the same is of 21 $\frac{1}{2}$ karets fine, & therefore forasmuch as the same is yet of a better finesse then hee would haue it, he must therefore mixe siluer therwith, that is to say, for 20 li. waight, or portions of gold he must take therto 1 li. $\frac{1}{2}$ of siluer.

$$20 \left\{ 21\tfrac{1}{2} \right. \begin{array}{|l} 20 \\ \\ 1\tfrac{1}{2} \end{array}$$

8 If he had 1 li. waight fine siluer of 12 Ounces fine, I demaund how much Copper hee must mixe with the same, to allay it vnto 11 ounc. $\frac{1}{4}$ fine, that is to say, to 11 Ounces 5 penny waight fine, make your alligation as before is taught. Then diuide the portion of Copper, by the portion of fine, and you shall finde $\frac{3}{45}$, which being abbreuied, is $\frac{1}{15}$. And thus to euery l. waight

waight of Siluer, you must take $\frac{1}{11}$ of a li. of copper, & for euery 11 pound $\frac{1}{4}$ of siluer, you must take $\frac{1}{4}$ of a li. of copper: and so is to be done with the same, in case that it were of any other allay.

9 A Master hath 1 li. of fine Gold of 24 karets fine, the which he would allay to 22 karets fine. The question is, to know how much siluer must be mixed with the same, that it may be of the finesse of 22 karets as before? Ans. Take the difference of 22 to 24, which is 2, then diuide 2 by 22, which you cannot, for they are $\frac{2}{22}$, but abbreuie them, and it is $\frac{1}{11}$. And so much siluer must be mixed with 1 li waight of fine Gold that the same may bee of 22 karets fine.

10 A Goldsmith hath 1 li. waight of Siluer billion of 7 ounces fine, it is demaunded how much fine Siluer hee must put to the same, that being molten together, it may be of 10 Ounces

fine. Answer. Make your alligation of 7, and 12 unto 10, and then diuide the portion of the fine Siluer, by the portion of Siluer billion, and you shal find 1 $\frac{1}{2}$: and thus to 1 li. waight of 7 ounces fine, you must take 1 li. $\frac{1}{2}$ of fine siluer of 12 Ounces fine to make the same of 10 ounces fine.

11 A Marchant hath giuen order unto his Factor to employ him 83 li. 6 s. 8 d. ster. in 5 sorts of spices, that is to say in Nutmegs of 80 d. the poūd Cloues at 76 d. the pound, Sinamon at 52 d. the pound, Ginger at 34 d. the pound, and Peper at 30 d. the pound. But hee hath not appoynted him the quantitie or portion which hee should buy of euery sort, neither yet of all the sorts together: the question is to know how much the Factor must buy of euery sort to haue of each of the like quantity. Answ. You must add 80, 76, 52, 34, and 30, together, and they make 273. Then you must diuide 83 li. 6 s. 8 d. being reduced into pence, namely

ly 20000 d. by 272, and therof cometh 73 li. $\frac{9}{17}$, and so many pounds must he buy of euery sort of the sayd spices.

12 But in case hee would not haue so many poundes of the one sort, as hée woulde haue of the other, then you must take another middle value bétwéene the sayd particulars, as for example, let the meane number be 50 d Then reduce the sayd 83 li. 6 s. 8 d. into pence as the other prices are, and they doe make 20000 pence, the same you must diuide by 50 pence, which is the meane or common price, and therof will come 400 li. And so many pounds must he haue of al the sorts together. Then if ye wil know how many pounds he must haue of euery sort, you must set downe your particular prices, after the middle value, that is to say, after 50 d. as héerafter followeth: And then worke by the Rule of company, and you shal find how much he shall buy of euery sort.

50	80	20
	76	16
	52	16
	34	26 & 2, all is 28
	30	30
		110

110 giue 400, what	20 :	*An.* 72 $\frac{8}{11}$
	16 :	*An.* 58 $\frac{2}{11}$
	16 :	*An.* 58 $\frac{2}{11}$
	28 :	*An.* 101 $\frac{9}{11}$
	30 :	*An.* 109 $\frac{1}{11}$
		400

Chap. 14.
Of the rule of Falſhood, or falſe *Poſitions.*

The Rule of Falſhood is ſo named not for that it teacheth any deceit or falſhood, but that by fayned numbers taken at all aduentures, it teacheth to find out the true number that is demanded. And this (of all the vulgar Rules which are in practiſe) is the moſt

most excellent: This Rule hath two partes, the one is of one false position alone, the other is of two positions, as héereafter shall appeare.

Those questions which are done by false positions, haue the operations in a maner like vnto that of the Rule of thrée: but onely that in the rule of thrée, wée haue thrée numbers knowen, and heere in this Rule, we haue but 1 Number that commeth in vse to work by: vnto the likenes wherof, we must deuise two other numbers, the one multiplying, & the other diuiding as by example.

1 I haue deliuered to a banket, a certayne summe of pounds in money, to haue of him by the yéere simplie, 6 Li. vppon the 100 Li. and at the end of 10 yéeres, hee paide mee 500 Li. for all both principall and gayne. I demannd how much was the principall summe that I deliuered him at the first? Here you sée that there are diuers Termes: but the chiefe to worke withall is 500 Li.

Li. which commeth of the other Numbers, that is to say, of 10, and 100, for of them is composed or made the tenor of the question, the practise whereof is thus.

Let vs faine a number at pleasure and with the same let vs make our discourse, euen as though it were the principall Summe that wee seeke for. As by example. Suppose that I deliuered him at the first 200 Li. the which were worth to mee in 10 yeeres 120 Li. after the rate of 60 Li. vppon 100 Li. Then 120 pound added with 200 li doe make but 320 Li. and I must haue 500 Li. Thus you see that I haue three termes of the Rule of Three: the one which shall containe the Question, the other Two which I haue formed artificially, which are 200, and 320: in such sort, that 320 ought to haue such proportion to 200, as 500 hath vnto the number that I seeke: that is to say, vnto the true principall Sum, then must I haue recourse vnto the Rule of Three, after this sort, saying.

If

If 320 li. become of 200 li. of how much shall come 500 pound, I do multiply 500 by 200, and they are 100000, the which I must diuide by 320 li. and thereof commeth 312 li. $\frac{1}{2}$, which is the Sum that I deliuered at the first. And thus this Rule hath some congruence with the double rule of thrée.

2 I haue a Cesterne with thrée vnequall cockes, contayning 60 pipes of water: And if the greatest cocke be opened, the water will voide cleane in one houre, at the second it wil auoid in 2 houres, & at the third it will require thrée houres: now I demand in what space it will auoyde, all the cockes being set open? Answe. Suppose that that it will auoyde in halfe an hower: that is to say, in 30 minuts. Then must there auoyde at the first Cocke the $\frac{1}{2}$ which is 30 pipes: and by the second cocke the $\frac{1}{4}$, which is 15 pipes, and by the third cocke the $\frac{1}{6}$, which is 10 pipes: all the which Summes beeing added together, doe make 55 pipes: but if

should

Li. which commeth of the other Numbers, that is to say, of 10, and 100, for of them is composed or made the tenor of the question, the practise whereof is thus.

Let vs faine a number at pleasure and with the same let vs make our discourse, euen as though it were the principall Summe that wée séeke for. As by example. Suppose that I deliuered him at the first 200 Li. the which were worth to mee in 10 yéeres 120 Li. after the rate of 60 Li. vppon 100 Li. Then 120 pound added with 200 li doe make but 320 Li. and I must haue 500 Li. Thus you sée that I haue thrée termes of the Rule of Thrée: the one which shall containe the Question, the other Two which I haue formed artificially, which are 200, and 320: in such sort, that 320 ought to haue such proportion to 200, as 500 hath vnto the number that I séeke: that is to say, vnto the true principall Sum, then must I haue recourse vnto the Rule of Thrée, after this sort, saying.

If

If 320 li. become of 200 li. of how much shall come 500 pound, I do multiply 500 by 200, and they are 100000, the which I must diuide by 320 li. and thereof commeth 312 li. $\frac{1}{2}$, which is the Sum that I deliuered at the first. And thus this Rule hath some congruence with the double rule of thrée.

2 I haue a Cesterne with thrée vnequall cockes, contayning 60 pipes of water: And if the greatest cocke be opened, the water will voide cleane in one houre, at the second it wil auoid in 2 houres, & at the third it will require thrée houres: now I demand in what space it will auoyde, all the cockes being set open? Answe. Suppose that that it will auoyde in halfe an hower: that is to say, in 30 minuts. Then must there auoyde at the first Cocke the $\frac{1}{2}$ which is 30 pipes: and by the second cocke the $\frac{1}{4}$, which is 15 pipes, and by the third cocke the $\frac{1}{6}$, which is 10 pipes: all the which Summes beeing added together, wee make 55 pipes: but it should

should bee 60 pipes. Therefore say by the Rule of three, if 55 pipes doe voyd in 30 minutes: in how many minuts will 60 pipes voyde? Multiply and diuide, and you shall find 32 minuts $\frac{40}{55}$ the which $\frac{40}{55}$ being abbreuied are $\frac{8}{11}$ of a minute, & in that space will the water voyde, if all the cockes be set open.

Of the Rule of two false Positions.

The summe of this Rule of Two false positions is thus, when any Question is proposed appertaning to this Rule. First you must imagine any Number at your pleasure, which you shall name the first position, and with the same you shall worke in stead of the true Number, as the question doth import: and if you see that you haue missed of the true Number that you doe seeke; Then is the last number of the work, either too great, or too little, the which number, you shall note with the signe of more or lesse,

for that is the first error, in the which you have failed, the which signes of more, & lesse shall be noted with these figures ×, —, This figure ×, betokeneth more: and this plaine line —, signifieth lesse: that is to say, the one signifieth too much, and the other too little: then you must beginne againe, and take another nūber, which shall be the second position, and worke by the question as before: if you haue failed againe, note the excesse or want for that is the second error. Then shall you multiply the first position by the second error crosse-wise, and agayne the second position by the first errour (and this must alwayes bee be obserued) and you must keepe the two products: then if the signes be both alike, that is to say, either both too much, or both too little, you shall abate the lesser product frō the greater, & likewise you shall substract the lesser error from the greater, and by the meane of those errors, you shal diuide the residue of the products, the qustient shall be the true

number

true Number that you seeke. But if the 2 signes bee vnlike, that is to say, the one too much, and the other too little, then you shall ad those products together, and likewise you must ad both the errors together, and by the sum of those errors, diuide the totall sum of both the products: the Quotient shall bee the true number that you doe seeke and this is the whole Rule, as by these examples following, it will appeare more playne

Example.

3 A Man lying at the poynt of death sayd that hee had in a certayne Coffer 100 duckets, the which hee bequeathed to 3 of his friends by him named, after this sort. The first must haue a certayne portion. The second must haue twice so many as the first abating 8 Duckets: and the third must haue three times so many as the first lesse by 15 Duckets. Now I demand how many euery of them must haue?

Answere.

Ans. First I do imagine that the first man had 30 Duckets, then by the order of the question, the second should haue 52, & the third 75. These thrée Summes béeing added together doe make 157, and I should haue but 100, so that this first errour is to much by 57, then I note apart the first position 30, with his errour 57 to much after this sort 30, $\times$ 57. Therefore I prosecute my worke, & I suppose that the first had 24, then by the order of the question, the second shall haue 40, and the third 57: these thrée summes being added together, doe make 121, and I must haue but 100, so the Second errour is to much by 21. Therefore I note 24, $\times$ 21, vnder the 30 $\times$ 57, which was the first position with the errour as you may sée in the worke on the next side following.

Then I multiply crosse-wise, 30 (which is the First position) by 21 which is the second errour, and thereof commeth 630. Likewise I multiply 24, (which is the second position)

by 57, which is the first errour, and I finde 1368: Then because the signes of the errors are both like that is to say both to much I must therfore subtract 630 from 1368 and there wil remayne 738 which is the dividend.

30. × 57.

24. × 21.

1368. 36.
630
738

Againe I must subtract the lesser error from the greater, that is to say, 21, out of 57, and there will remaine 36, which shall be my divisor. This done I divide 738, by 36, and the quotient will be $20\frac{1}{2}$.

$20\frac{1}{2}$.
33.
$46\frac{1}{2}$.
100

21
738
366. ($20\frac{1}{2}$.
3

The

The which $20\frac{1}{5}$, is the iust Number of the Duckets, that the first man had for his part, so consequently the second man had 33 Duckets, and the third $46\frac{1}{5}$, as by the working afore may appeare.

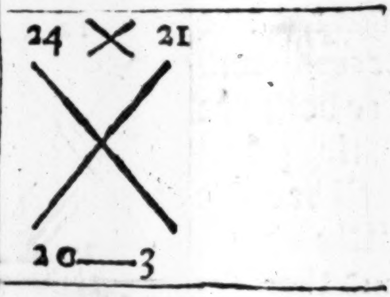
The like number will also appeare in case the errors were both too little, as in making the two positions by 18 and 20, and you shal find that the two errors will bee both too little, ẏ first will bee too little by 15, and the Second too little by Three as by perusing this worke, you shall well perceiue.

54.
18 —— 15
20 —— 3.
300. 12
54.
246. | 246 ($20\frac{1}{5}$.
12
1

Againe, if one of the errors were too

much, and the other too little, yet you shall haue the true number, as before. And if the two positions were 24, and 20, you shall finde that the first error will bee 21 too much, and the second will bee 3 too little. Therefore multiply 24 by 3 crosse-wise, thereof commeth 72.

Likewise multiply 20 by 21, the product will bee 420. These two summes 72 and 420, you shall adde together, for because the signes of the errors bee vnlike, and they make 492, ẏ which shall bee your diuidend, and agayne, adde the lesser error 3, with ẏ greater error 21, and they make 24 for your diuisor, then



420 24
72
492

1
492
244 (20½
2

then diuide 492 by 24, the quotient will bee $20\frac{1}{2}$: as before doth playnely appeare.

And now because you shall not forget this part of the Rule, learne this breefe remembrance.

The signs both like, subtractiō do requir
And vnlike signs, Addition will desire.

The meaning whereof is thus, if both the errours haue like signes, then must the Diuidend and the Diuisor be made by subtraction, as is taught before, & if those signes bee vnlike, then must you by addition gather the Diuidend, and the diuisor, as I haue done in this last example.

Another Example.

4 A man hath two siluer Cuppes of vnequall waight, hauing to them both but one couer, the waight whereof is 5 ounc. if the couer be put to the lesser cuppe, it will be in double proportion

vnto the waight of the greater, and the couer béeing put to the greater cuppe, it will be in triple proportion vnto the waight of the lesser. I demand what was the waight of euery cuppe? Ans. Suppose that the lesser cup did waigh 7 ounces, then with the couer it must waigh 12 ounces, & this waight should bee double proportion vnto the greater, therfore the greatest must waigh but 6 Ounces, adde vnto it 5 ounce, for the couer all will be 11 ounces, but it should bee 21, for to haue it in triple proportion vnto 7. which represẽtes the waight of the lesser cup: So tha[t]

105
7 —— 10
9 —— 15
95 5
105
90 | 15 (3 ounces.
15 | 5

thi[s]

this first Errour is too little by 10, which you shal note after 7 in this sort 7, ——— 10.

After you shall suppose some other number, as 9, and make the like work as before, so you shall find 15 too little for the second errour, which you shall put behinde 9 with the signe lesse thus ——— 15, & then worke with the rest as aboue is sayd, and you shall find that the lesser Cup weighed Three ounces, and consequently the greater Foure Ounces.

5 One man demanded of another in a morning what a clock it was, the other made him this answere, if you doe adde (sayth hee) the $\frac{1}{4}$ of the houres which bee past since Midnight with the $\frac{2}{3}$ of the Howers which are to come vntill noone, you shall haue the iust hower, that is to say, you shall know what a clocke it was. Answer. Suppose that it was 4 a clocke in the Morning, so should there remaine 8, vntill noone, then I take the $\frac{1}{4}$ of 4,

which is 1, and the $\frac{2}{3}$ of 8 which is 5 $\frac{1}{3}$ and I adde them together, so I find 6 $\frac{1}{3}$, and I supposed but 4 therefore this first error is too much by 2 $\frac{1}{3}$, which I note after my position, thus 4 + 2 $\frac{1}{3}$: then againe I suppose another Number, that is to say 9, so should remaine but 3 houres vntill noone. I take the $\frac{1}{4}$ of 9, and the $\frac{2}{3}$ of 3, which is 2 $\frac{1}{4}$ and 2 these I adde together, and they make 4 $\frac{1}{4}$: but I supposed that it was 9, therefore the second errour is 4 $\frac{3}{4}$ too little, which I note behind my position thus 9 — 4 $\frac{3}{4}$

And then I multiply crosse wise, as before is taught, & because the signs of ye errors are vnlike, that is to say, the one too much, & the other too litle, therfor in this worke I must adde the products, and they

4 + 2 $\frac{1}{3}$.

9 — 4 $\frac{3}{4}$.

21. 7 $\frac{1}{12}$.

19.

40.

they will be 40. Likewise I must ad the errors and they bee 7 $\frac{1}{11}$. Then I diuide 40 by 7 $\frac{1}{11}$, and thereof commeth 5 houres $\frac{11}{17}$, and that houre it was in the morning.

Chap. 15.
Of diuers Questions extraordinarie, every one of them contayning a generall Rule for such like Examples.

1 FIue Men deuising of their ages, The first sayde to the others, that hee was 120 yeeres of age: the 2 said if my yeares were doubled then shold I haue so many yeeres more than the first man, as the first hath now more than I haue: The third sayd in like manner, if my yeares were tripled. The 4 said if my yeeres were quadrupled, that is to say, multiplyed by 4: The fift sayde that if his yeeres were quintupled, that is to say, multiplied by 5, that they shold each of them haue so many yeers more then the first man as

as hee hath now more than every one of them. The question is to know how old every of the other 4 men were?

Answer. You must take the numbers which are neerest collaterals, in naturall order unto 2, 3, 4, and 5 by reason of dupling, tripling, &c. And the greater of every of the sayd Numbers collaterals, must bee your denominator, to the lesser Number. As thus the next collaterall numbers unto 2, are 1, and 3, which is $\frac{1}{3}$. Likewise the next collaterall numbers to 3 are 2 and 4 which is $\frac{2}{4}$. And so for 4, are 3 & 5 which are $\frac{3}{5}$, and for 5 are 4, & 6 which bee $\frac{4}{6}$. Then if you will know the second mans age, you must adde unto 120 the $\frac{1}{3}$ of it selfe which is 40, all is 160, the same you must divide by 2, & thereof commeth 80 yeeres, and so old was the second man. And for to know the age of the third man: You must ad unto 120 his owne $\frac{2}{4}$, that is to say, his $\frac{1}{2}$, which is 60, and they make 180. The sayd summe you must divide by 3, & thereof commeth 60 yeers

for

for the third mans age. And after the same manner, you shall find that the fourth man had 48 yeeres, and the fift had 40 yeeres. The proofe is very easie.

2 A man hauing his eye sight somewhat altered, beganne to tell and reckon a certaine Number of birds to be in all 18. His Companion that had a cleerer sight, beholding well the birds: Answered him that there were not 18. But said he, if there were twise so many more as there are, there should bee as many more aboue 18, as there bee now lesse than 18. The question is to know, how many Birdes there were in all? Answe. You must adde vnto 18 his $\frac{2}{4}$, that is to say his $\frac{1}{2}$, and thereof will come 27, the which you shall diuide by 3, and thereof commeth 9. And so many birdes were there in all.

3 A Draper hath bought 24 sorting cloathes, and he hath sold 100 pounds

worth

worth of the same Cloathes, upon the which hee had gayned, as much as 1 Cloth did coste him. I demaund what 1 of the sayde Cloathes did coste him? Answ. You must adde 1 unto 24, and they make 25. Then diuide 100 by 25, and thereof will come 4 li. and so much did one cloth cost him.

4 A Mayde carryed egges unto the Market, and it happened a merry fellow to meete her, who began to iest with her in such sort, that hee ouerthrew her Basket, and brake all her Egges, the Mayde being much displeased with him for breaking of the same, said very ernestly unto him that he should pay for them: the man considering with himselfe that by his folly they were broken, answered the maid that hee woulde pay her for them, and therefore hee demaunded of her what number she had? The silly poore wench that could not well reckon, sayd unto him, that she could not well tell him, but sayde shee, when I did put them into

into my Basket by 2 and by 2, there remained 1 Egge: and when I counted them by 3 and by 3, there remayned 1: and when I did reckon them by 4 and by 4, there remained still 1: but when I did count them by 5 and by 5, there remained none. The question is to know, how many egges the maid had in all? Answere. For to doe this, and all such like questions, you must multiply 2, 3, and 4 together: saying 2 times 3 make 6, and 6 times 4 make 24, unto this number you must adde 1, and they make 25. And so many egges she had in all. But if she had had a greter number of Egges that shee might haue counted them till she came to 7 & 7, after the same manner as shee did, till she came to 5 and 5, you must multiply these Numbers 2, 3, 4, 5, and 6, the one by the other, and thereof will come 720, unto the which adde 1, and they make 721. And so many Egges she should haue had, if she had counted them by 7 and 7.

5. Againe,

5 Agayne, if shee had sayd, that when shee counted her Egges 2, and by 2 there remayned 1, and by 3 & 3, there remayned 2, and by 4 and 4, there remained 3, and by 5 and by 5, there remained nothing. The question is to know, how many egges she should haue had? Answe. You must find a Number the least that you can possible, which may bee diuided by 2, by 3, and by 4, that is to say, 12 is the néerest number, diuide the same by 5, and there remaineth 2. This béeing done, you must find 2 numbers ẏ least that is possible, which may be diuided by 5, & by 2, in such sort that the number which is diuided by 2 may excéed (the other that is diuided by 5) only by 1, and those 2 numbers are 10, and 6, for if you diuide 6 by 2, your quotient will be 3, and 10 diuided by 5, bringeth but 2: then consider, that 6 containeth 3 times 2, and therefore you must multiply 12 by 3, & they make 36 from ẏ which you must subtract 1, and there will remaine, 35, which is the number

that

that is required to be found.

6 And if shee had counted them after the same manner unto 7, and that there had remayned nothing then you know that 60 is the neerest number that may be diuided by 2, 3, 4, 5, and 6, the which 60 beeing diuided by 7 there will remaine 4, and therfore you must finde two numbers the least that may be, that can be diuided by 4, & by 7, in such sort, that that Number which is diuided by 4, may exceede the other number (by 1,) that is diuided by 7, the which 2 numbers are 7, and 8, for if you diuide 8 by 4 your quotient wil be 2. And diuiding 7 by 7, your quotient will be 1, and therefore for because that 8 containeth 2 times 4, you must multiply 60 by 2, and thereof cometh 120, from the which number you shall subtract 1, and the residue which are 119, is the number that is required.

7 A Theefe entring into a Garden, did steale from thence a certain number

ber of Apples : And at his comming forth, hee did meet with 3 men, one after another, who threatned to accuse him : and for to appease him, hee gaue vnto the first the $\frac{1}{2}$ of all his Apples, who receiued the same with thankes, but hee returned him 12 of them backe againe. Then he gaue vnto the second the $\frac{1}{2}$ of them that hee had remaining, who receiued the same, but hee gaue him backe againe 7 apples : and so hee gaue vnto the 3 man, the $\frac{1}{2}$ of the residue who returned him 4. And in the end hee had still remaining 20 apples. The question is to know, how many apples hee gathered in the sayde Garden ? Answ. For to doe this you shal substract 4 from 20, and there will remayne 16, the same you shall double, & they make 32: from the which you must abate 7, and there wil remaine 25: the same you shall double, and they make 50 : from the which you shall subtract 12, and there will remaine 38, whereof the double which is 76 doth shew the Number of apples that he gathered.

red. This and such like questions are easie to be done in going backwardes from the end of the question untill you come to the beginning thereof. But if hee had giuen the $\frac{1}{3}$ unto one of them, the $\frac{1}{3}$ unto another, and $\frac{1}{4}$ unto the last, or any other, all the same may be done by the conuerse rule, that is to say, beginning at the end of the question, till you come to the beginning as before is sayd.

8 A Marchant did ride unto three seuerall faires: at the first hee doubled his money and spent 10 Crownes, at the second faire he did also double his money and spent 10 Crownes: And likewise at the 3 faire, hee did double his money and spent 10 Crownes, and in the end, hee found that he had remaining but 2 crownes. The question is to know, how many Crownes hee had at the first? Ans. For to doe this, you must ad unto 10 crownes, the two Crownes which hee had remayning, and they make 12, whereof you shall

take the $\frac{1}{2}$ which is 6: agayne adde 6 vnto 10, and they make 16, whereof you shal take the $\frac{1}{2}$, which is 8: finally, you shall adde 8 vnto 10, and they make 18, whereof you must take the $\frac{1}{2}$ which is 9: and so hee had 9 crownes at the first.

9 A Burgesse would distribute a certayne summe of pence vnto diuers poore men equally: but after that he had counted how many they were in number, he perceiued that if he should giue vnto euery man 6 d. hee shoulde want 14 pence: But if hée should giue euery man 5 pence the péece, he should haue 9 pence remaining. The question is to know the number of ẏ poore men. Answ. For to doe this, and such like questions, you must haue in remembrance this principle, more from more. or lesse from lesse, &c. which is set out in 2 verses in the Rule of false positions, that is to say, you must adde the lesse with the more. Namely, 14 with 9, and they make 23: and diuide the same

same summe by the difference which is of 5 from 6 that is 1. And therfore you must diuide 23 by 1, but 1 doth neither multiply nor diuide, therfore you may conclude, and say that there were 23 poore men.

10 And if hee should giue to euery man 5 pence, hee should haue 19 pence remayning, and giuing euery man 7 d. hee should haue 3 pence ouer: In this case you must abate more from more, that is to say, 3 from 19 and the rest which is 16, you must diuide by two, which is the difference of 5 from 7: & the quotient which is 8, doth shew you the number of the poore men: and likewise if that hee had had both wantes, that is, if both the Numbers had béene to little, you must haue done with thē as you did with the others that were both more.

11 A man hath giuen vnto 20 workfolks 20 s. that is to say, vnto men, women, and boyes: vnto men he gaue 20 pence a péece, vnto Women 15 d. and vnto boyes he gaue 8 pence. The

question is to know, how many men, how many women, & how many boies there were in all? Anſwer. First you muſt take the difference of 8 from 15 and alſo from 20: and you ſhall haue 7 for the difference of the woman: and 12 for that of the man: this done, you may ſuppoſe that there were 20 boyes the which at 8 pence the peece maketh 160: the which you muſt abate from 20 s. being reduced into pence, that is from 240 pence, & there will remaine 80 pence, the which 80 you ſhall diuide into 2 ſuch parts that the one may bee diuided by 7, and the other by 12, & that nothing may remayne after the diuiſions are made. The which 2 numbers are 56, and 24: For 56 being diuided by 7, bringeth into the quotient 8, and 24 being diuided by 12, will bring into the quotient 2: which ſheweth that there were 8 Women, 2 men. And the reſt of the 20, which are 10, were boyes, ſo there were 8 women 2 men, and 10 boyes. Some men doe call this Rule, the Virgins Rule.

Chap. 16.
Of sports and pastime, done by *Numbers*.

If you woulde know that Number that any man doth thinke, or imagine in his minde as though you could deuine.

Bid him triple the same Number, then of the product let him take the ½, if the number be euen, or else the greter halfe, if the same bee odde, then bid him triple againe the sayd ½: after say to him, that he shal put away if he can 36, 27, or 9, from the last number being tripled: that is to say, cause him subtilly to put away 9, as many times as is possible, and kéepe the number secretly: and when he can no more take away 9: then to know if that yet there remaine any Number, bid him abate 3, 2, or 1, if he can: this done, sée how many times 9 you haue caused him to abate, for the which kéepe you in mind

 so

so many times 2, & if that you know that hee had any thing remayning besides the nines, the same shal also note unto you 1.

Example.

Suppose that hee thought 6 which being tripled is 18, whereof the $\frac{1}{2}$ is 9, the triple of that is 27: now cause him to abate 18, or 9 or 27: and againe 9, but then hee will say unto you that hee cannot, bid him then abate 3, or 2 or 1 he wil say also that he cannot wherfore considering that you haue made him to abate 3 times 9 iustly, you shall tell him that hee thought 6, for 3 times 2 maketh 6. If he had thought 5 the triple thereof is 15, whereof the greater $\frac{1}{2}$ is 8, the triple of ẏ maketh 24 which containeth 2 times 9, they are worth 4, and the remaine signifieth 1, the which added together make 5 which is the number that he thought.

2 If in any company, one of them hath a King vppon his finger, and you would

woulde know by manner of diuining who hath the same and vpon what finger and what ioynt: cause the persons to sit downe in order. and keepe likewise an order of three fingers: then separate your self from them in som certaine place, and say vnto one of the lookers on, that hee double the Number (marking wel in your mind the order) of him that hath the King: & vnto the double bid him adde 5, and then cause him to multiply this addition by 5 and vnto the product bid him adde the number of the Finger of the person which hath the King: Suppose that the same last Summe did amount to 89, then after ward say to him, that hee put after the same last number toward his right hand, a figure signifiyng vpon which of the ioynts hee hath the King, as if it be vpon the third ioynt, let him put 3 after 89, and it will be 893, this done, you shall aske him what Number hee keepeth, from the which you shall abate 250, and you shal haue Three Figures remaining at the

 least

least. The first toward your left hand shall signifie the number of the person which hath the King. The second or middle figure shall represent the number of the finger. And the last figure toward your right hand, shall beetoken the number of the ioynt. As if the number which he did keepe were 883 from that you shall abate 250, & there will remaine 643, which doe note vnto you, that the first person hath the King vpon the fourth finger, and vppon his third ioynt.

But note that when you haue made your substraction, if there do remaine a cipher in the place of tens, that is to say, in the second place you must then abate 1 from that figure which is in the place of hundreds, that is to say, from the figure which is next your left hād, and that shall bee worth ten Tenths, signifiyng the tenth finger: as if there should remaine 203, you must say, that the first person (vppon his tenth finger, and vpon his third ioynt) hath the King.

3 And after the same maner, if a man doe cast thrée dice, you may know the points of every one of them, for if you doe cause him to double the pointes of one die, and unto the double to adde 5, and the same summe to multiply by 5, and unto the product adde the points of one of the other dice, and behind that number toward the right hand, to put the figure which signifieth the pointes of the last die, and then shall you aske him what Number hee kéepeth, from the which abate 250, & there will remaine 3 figures: which doe note unto you the points of every die.

4 Likewise if thrée of your companions, to say, Peter, James, & John would (in your absence) give themselves every one a contrary Name: as for example: Peter would be called a King, James a Duke, and John a County: And you would devine which of them is called a King, which the Duke, and which the County. Take 24 stones, or other péeces whatsoever and give unto Peter 1, unto James

2, and

2, and unto John 3, or otherwise. But marke well unto which of them you haue giuen 1, unto which 2, and unto whom 3. Then leauing the 18 stones (before them) that are remaining, you shall absent your selfe from their sight, or else turne your face from them, saying thus unto them: whosoeuer nameth himselfe a King, for euery stone that I gaue him, let him take 1 of the residue; and hee that nameth himselfe a Duke, for euery stone that I gaue him, let him take 2 of thē that remaine; and he that calleth himselfe a County, for euery stone that I gaue him, let him take 4: this being done, approach neere them, and marke how many stones are remaining: & know this, that there cannot remaine any other number, but one of these sixe, 1, 2, 3, 5, 6, 7, for the which six numbers we haue chosen to euery of them a seuerall name which are these: *Angeli, Beati, Taliter, Messias, Israel, Pietas*: each of them containing three vowels *a, e, i*, which doe shew the names by order:

order: That is to say, the vowell *a*, sheweth which is the King, the vowel *e*, telleth which is the Duke, and the vowell *i*, sheweth which is the County: in following the order how, and to

1	2	1	2	3	3
2	1	3	3	1	2
3	3	2	1	2	1
a	e	a	e	i	i
e	a	i	i	a	e
i	i	e	a	e	a
1	2	3	5	6	7
A	*B*	*T*	*M*	*I*	*P*

whome you haue giuen one stone, to whom 2, and to which 3, then if there do remain but one stone, ẏ first name *Angeli*, (by these 3 vowels, a, e, i,) sheweth that Peter is King, James the Duke, and John the County. And if there doe remaine 2 stones, the second Name *Beati*, shall shew you by these 3 vowells a, e, i, that Peter is the Duke, James the King, and John the County. And so of the other, as by this table doth plainely appeare.

FINIS.

The agreement of the measures, & waights of diuers Countries, the one with the other, being reduced *to an eqnality, and drawne into Tables, as followeth.*

London.

100 ells at London doe make at	Antwarpe	166 $\frac{2}{3}$
	Nuremberge.	174 $\frac{1}{6}$
	Franckf. Liebsig. & Preslaw	208 $\frac{1}{3}$
	Dantzicke.	138 $\frac{1}{3}$
	Vienne in Austri.	145.
	Lyons in France.	101 $\frac{2}{3}$ aulnes.
	Paris in France.	095
	Rouan in Norm.	086 $\frac{2}{3}$
	Lishburne	100. vares.
	Siuell & other places in spaine.	153.
	The Isle of Mardere.	103 $\frac{1}{3}$
	Venice	180 braces.
	Lucques	200 braces.
	Florence	204 $\frac{1}{3}$ braces
	Millan	230.
	Geanes.	480 $\frac{5}{6}$ paulms

The like agreement hath 125 yards, vnto the measures aforesayd.

The agreement of the measure at Antwarpe, *with the measures at other places.*

Antwarpe.

100 ells at Antwarpe, do make at	London, yards 75,	& 60 elles.
	Nuremberge.	$104\frac{1}{2}$
	Franckford, &c.	125
	Dartzicke.	83
	Vienne, &c.	87
	Lyons	60 aulnes.
	Paris	57
	Rouan	52
	Lishborne	60 vares
	Siuell, &c.	81
	The Iles, &c.	62
	Venice	108 braces.
	Lucques	120
	Florence	$122\frac{1}{5}$
	Millan	139
	Geanes.	$288\frac{1}{5}$ paulms.

The agreement of the measure of *Nuremberge, with the measures at other places.*

Nuremberge.

100 elles at Nuremberg do make at

London	57 2/5	elles.
Antwarpe,	95 3/5	
Franckford, &c.	119 3/5	
Dantzicke	79 2/2	
Vienne, &c.	83 1/4	
Lyons	58 2/5	aulnes.
Paris	54 1/2	
Rouan	49 3/4	
Lishborne	27 2/5	vares.
Syuell, &c.	77 1/2	
The Isles, &c.	58 1/3	
Venice	103 1/3	braces.
Lucques	114 4/5	
Florence.	117 1/5	
Millan	132.	
Geanes	276	paulmes.

The agreement of the measure at *Franckeford, &c. with the measures at other places.*

Franckeford, &c.

100 ells at frãkford, do make at

London	48	elles.
Antwarpe	80	
Nuremberge	83 $\frac{3}{5}$	
Dantzicke	66 $\frac{2}{5}$	
Vienne, &c.	69 $\frac{3}{5}$	
Lions	58 $\frac{4}{5}$	aulnes.
Paris	45 $\frac{3}{5}$	
Rouan	41 $\frac{3}{5}$	
Lishborne	48	vares.
Siuell	64 $\frac{4}{5}$	
The Isles, &c.	49 $\frac{3}{5}$	
Venice	86 $\frac{2}{5}$	braces.
Lucques	96	
Florence	98	
Millan	110 $\frac{2}{5}$	
Geanes	230 $\frac{4}{5}$	paulmes.

The agreement of the measure at *Dantzicke, &c. with the measures at other places.*

Dantzicke.

100 ells at Dantzicke do make at	London	$72\frac{1}{4}$ elles.
	Antwarpe	$120\frac{1}{2}$
	Nuremberge	$125\frac{7}{8}$
	Franckford	$150\frac{5}{8}$
	Vienne, &c.	$108\frac{1}{2}$
	Lyons	$73\frac{1}{2}$ aulnes.
	Paris	$68\frac{5}{8}$
	Rouan	$62\frac{5}{8}$
	Lishborne	$72\frac{1}{4}$ vares.
	Siuell, &c.	$97\frac{1}{2}$
	The Isles, &c.	$74\frac{5}{8}$
	Venice	130 braces.
	Lucques	$144\frac{1}{2}$
	Florence	$147\frac{1}{2}$
	Millan	$166\frac{1}{4}$
	Geanes.	$347\frac{1}{2}$ paulmes.

The agreement of the measure at *Vienne, with the measures at other places.*

Vienne in Austrice.

100 ells at Viene, doe make at

London	68 $\frac{9}{10}$	elles
Antwerpe	114 $\frac{9}{10}$	
Nuremberge	120	
Franckeford, &c.	143 $\frac{5}{8}$	
Dantzicke	95 $\frac{3}{5}$	
Lions	70 $\frac{1}{10}$	aulnes.
Paris.	65 $\frac{1}{2}$	
Rouan	99 $\frac{3}{4}$	
Lishborne	68 $\frac{9}{10}$	vares.
Siuell &c.	93 $\frac{1}{10}$	
The Isles, &c.	71 $\frac{1}{4}$	
Venice	124 $\frac{1}{4}$	braces.
Lucques	137 $\frac{9}{10}$	
Florence	140 $\frac{4}{5}$	
Millan	158 $\frac{3}{5}$	
Geanes	331 $\frac{2}{5}$	paulmes.

The agreement of the measures at Lyons, *with the measures at other places.*

Lions.

100 aulnes at Lions doe make at

London	98 1/3	elles.
Antwarpe	163 7/8	
Nuremberge	171 1/4	
Franckford, &c.	204 5/6	
Dantzicke	136	
Vienne	142 1/5	
Paris	93 2/3	aulnes.
Rouan	85 1/8	
Lishborne	98 1/8	vares.
Syuell	132 3/4	
The Isles, &c.	101 3/5	
Venice	177	braces
Lucques	296 2/3	
Florence	200 3/4	
Millan	226 1/5	
Geanes.	472 7/8	paulmes.

The agreement of the measure at Paris, *with the measures at other places.*

		Paris.	
100 aulnes at Paris, doe make at	London	105 $\frac{1}{4}$	elles.
	Antwerpe	175 $\frac{2}{3}$	
	Nuremberge	183 $\frac{1}{3}$	
	Franckeford, &c.	219 $\frac{1}{4}$	
	Dantzicke	145 $\frac{3}{5}$	
	Vienne	152 $\frac{1}{2}$	
	Lions	107	aulnes.
	Rouan	91 $\frac{1}{5}$	
	Lishborne	105 $\frac{1}{4}$	vares.
	Sivell &c.	142	
	The Isles, &c.	108 $\frac{3}{4}$	
	Venice	189 $\frac{2}{5}$	braces.
	Lucques	210 $\frac{1}{2}$	
	Florence	214 $\frac{7}{8}$	
	Millan	242	
	Geanes	506 $\frac{1}{3}$	paulmes.

The agreement of the measures at *Rouan, with the measures at other places.*

Rouan.

100 aulnes at Rouan doe make at	London	$115\frac{3}{8}$	elles.
	Antwarpe	$192\frac{1}{4}$	
	Nuremberge	$206\frac{7}{8}$	
	Franckford, &c.	$240\frac{3}{8}$	
	Dantzicke	$159\frac{3}{5}$	
	Vienne	$167\frac{1}{4}$	
	Lyons	$117\frac{1}{4}$	aulnes.
	Paris	$109\frac{3}{5}$	
	Lishborne	$115\frac{3}{8}$	vares.
	Syvell	$155\frac{3}{4}$	
	The Isles, &c.	$119\frac{1}{5}$	
	Venice	$207\frac{2}{5}$	braces
	Lucques	$230\frac{3}{4}$	
	Florence	$235\frac{1}{8}$	
	Millan	$265\frac{3}{8}$	
	Geanes.	$554\frac{4}{5}$	paulmes.

The agreement of the measure at *Lishborne, with the measures at other places.*

Lishborne.

100 vares at Lish-born do make at

London	100 elles.
Antwarpe	196 $\frac{2}{3}$
Nuremberge	174 $\frac{1}{2}$
Franckford, &c.	208 $\frac{1}{3}$
Dantzicke	138 $\frac{2}{3}$
Vienne	145
Lyons	101 $\frac{2}{3}$ aulns.
Paris	095
Rouan	086 $\frac{2}{3}$
Syuell, &c.	135 vares.
The Isles, &c.	163 $\frac{2}{3}$
Venice	180 braces.
Lucques	200
Florence	204 $\frac{1}{2}$
Millan	230
Geanes	480 $\frac{1}{2}$ paulms

The agreement of the measure at Venice, *with the measures at other places.*

Venice.

100 braces at Venice doe make at	London	55 $\frac{1}{3}$	elles.
	Antwarpe	92 $\frac{1}{2}$	
	Nuremberge	96 $\frac{3}{4}$	
	Franckford	115 $\frac{3}{8}$	
	Dantzicke	76 $\frac{4}{5}$	
	Vienne, &c.	80 $\frac{1}{3}$	
	Lyons	56 $\frac{1}{4}$	aulnes.
	Paris	52 $\frac{3}{4}$	
	Rouan	48 $\frac{1}{8}$	
	Lisbborne	55 $\frac{1}{2}$	vares.
	Sivell, &c.	75	
	The Isles, &c.	57 $\frac{2}{5}$	
	Lucques	111	braces.
	Florence	113 $\frac{2}{5}$	
	Millan	127 $\frac{3}{4}$	
	Geanes.	267 $\frac{1}{8}$	paulmes.

The agreement of the measure at Geanes, *with the measures at other places.*

Geanes.

100 palmes at Geanes doe make at	London	20 $\frac{3}{4}$	elles.
	Antwarpe	34 $\frac{3}{5}$	
	Nuremberge	36 $\frac{1}{5}$	
	Franckford, &c.	43 $\frac{1}{8}$	
	Dantzicks	28 $\frac{3}{4}$	
	Vienne	39 $\frac{1}{8}$	
	Lyons	21 $\frac{1}{8}$	aulns.
	Paris	19 $\frac{3}{4}$	
	Rouan	18	
	Lishborne	20 $\frac{3}{4}$	vares.
	Syuell, &c.	28	
	The Isles, &c.	21 $\frac{2}{5}$	
	Venice	37 $\frac{2}{5}$	braces.
	Lucques	41 $\frac{1}{2}$	
	Florence	42 $\frac{2}{5}$	
	Millan	47 $\frac{4}{3}$	

The agreement of the measure at *Millan, with the measures at other places.*

Millan.

100 braces at Millan doe make at

London	$43\frac{2}{5}$	elles.
Antwarpe	$72\frac{2}{5}$	
Nuremberge	$75\frac{5}{8}$	
Franckford	$90\frac{1}{2}$	
Dantzicke	$60\frac{1}{8}$	
Vienne, &c.	93	
Lyons	$44\frac{1}{5}$	aulnes.
Paris	$41\frac{1}{4}$	
Rouan	$37\frac{2}{5}$	
Lishborne	$43\frac{3}{5}$	vares.
Sivell, &c.	$58\frac{2}{5}$	
The Isles, &c.	$44\frac{7}{8}$	
Venice	$78\frac{1}{4}$	braces.
Lucques	$86\frac{7}{8}$	
Florence	$88\frac{3}{4}$	
Geanes.	209	paulmes.

The agreement of the measure at Florence, *with the measures at other places.*

Florence.

100 braces at Florence, do make at	London,	49 elles.
	Antwarpe	81 $\frac{2}{8}$
	Nuremberge.	85 $\frac{1}{4}$
	Franckford, &c.	102
	Dantzicke.	67 $\frac{3}{4}$
	Vienne, &c.	71
	Lyons	49 $\frac{3}{4}$ aulnes.
	Paris	46 $\frac{1}{2}$
	Rouan	42 $\frac{2}{5}$
	Lishborne	49 vares
	Siuell, &c.	42 $\frac{2}{5}$
	The Isles, &c.	50 $\frac{3}{5}$
	Venice	88 $\frac{1}{2}$ braces.
	Lucques	97 $\frac{7}{8}$
	Millan	112 $\frac{3}{5}$
	Geanes.	235 $\frac{1}{5}$.

The agreements of the waights of diuers Cuntries, the one with the other *being reduced to an equality, & drawne into Tables: as followeth.*

London.

112 li. waight at London, do make at

Antwarpe	107 $\frac{5}{8}$
Franckford	99.
Collen & Ausberg,	102 $\frac{1}{4}$
Nuremberge	100 $\frac{1}{2}$
Rouan	098.
Lions	118 $\frac{1}{2}$
Paris	102 $\frac{1}{4}$
Diepe	100 $\frac{1}{4}$
Geneua	90 $\frac{3}{8}$
Toulouse	122 $\frac{3}{4}$
Rochell	124 $\frac{7}{8}$
Marseilles	124 $\frac{1}{4}$
Sicill, &c.	109 $\frac{3}{4}$
Uenice sut: wai.	166 $\frac{7}{8}$
Uenice grost wa.	105 $\frac{3}{8}$
Aquilla	157 $\frac{1}{4}$
Uienne	89 $\frac{3}{8}$
Breslawe	134 $\frac{5}{8}$
Liebzig	101 $\frac{1}{4}$
Dantzig	129 $\frac{1}{4}$
Lubeck	97 $\frac{3}{8}$
Barcellone	143 $\frac{1}{2}$
Lishburne, &c.	99.
Geanes.	157 $\frac{1}{4}$

The agreement of the Waights at Antwarpe, with the waights *at other places.*

Antwarpe.

100 places at Antwarpe domake at

London	104 li.
Frankford	91 $\frac{7}{8}$
Collen, &c.	94 $\frac{7}{8}$
Nuremberge	93
Rouan	091
Lions	110
Paris	096 $\frac{1}{4}$
Diepe	093
Geneua	084
Toulouse	114
Rochell	116
Marseilles	115 $\frac{1}{4}$
Sinell, &c.	101 $\frac{7}{8}$
Venice sut:wai.	155
Venice groß wa:	097 $\frac{3}{4}$
Aquilla	146
Vienne	83
Preslaw.	125
Liebzig	094
Dantzig.	120
Lubecke	90 $\frac{1}{4}$
Barcellone	133 $\frac{1}{4}$
Lishburne, &c.	084 $\frac{1}{2}$
Geanes.	146 $\frac{3}{4}$.

The agreement of the Waights at Franckford, with the waights *at other places.*

Franckford.

100 li. waight at frāk-ford, do make at

London	113 $\frac{1}{8}$
Antwarpe	108 $\frac{3}{4}$
Collen, &c.	103 $\frac{1}{4}$
Nuremberge	102 $\frac{1}{8}$
Rouan	099
Lions	118 $\frac{1}{2}$
Paris	103 $\frac{1}{4}$
Diepe	101 $\frac{1}{4}$
Geneua	91 $\frac{1}{4}$
Toulouse	124
Rochell	126 $\frac{1}{8}$
Marseilles	125 $\frac{1}{2}$
Siuell, &c.	110 $\frac{3}{4}$
Venice sut:wai.	168 $\frac{1}{2}$
Venice groß wa:	106 $\frac{2}{8}$
Aquilla	158 $\frac{1}{4}$
Vienne	90 $\frac{1}{4}$
Preslaw.	135 $\frac{7}{8}$
Liebzig	102 $\frac{1}{4}$
Dantzig.	130 $\frac{1}{2}$
Lubecke	68 $\frac{1}{4}$
Barcellone	144 $\frac{7}{8}$
Lishburne, &c.	100.
Geanes.	158 $\frac{3}{4}$.

The agreement of the waight at Rouan, with the waights *at other places.*

100 li. waight at Rouan doe make at	Rouan.
London	114 1/4
Antwarpe	109 7/8
Franckford, &c.	101
Collen &c.	104 1/4.
Nuremberge	102 1/8
Lions	120 7/8
Paris	104 1/4
Diepe	102 3/4
Geneua	92 1/4
Toulouse	125 1/4
Rochell	127 1/4
Marceiles	126 3/4
Syuell	112
Venice, &c.	170 1/4
Venice, &c.	107 1/8
Aquilla	160 1/4
Vienne	91
Preslaw	137 1/4
Liebzig	103 1/4
Dantzicke	131 7/8
Lubecke	99 3/4
Barcellone	146 1/4
Lishborne	101.
Geanes.	160 1/4

The agreement of the VVaight at Paris, with the waights at *other places.*

Paris.

100 li. waight at Paris do make at

London	109 $\frac{1}{2}$
Antwarpe	105 $\frac{1}{4}$
Franckford	96 $\frac{3}{4}$
Collen, &c.	102 $\frac{1}{4}$
Nuremberge	97 $\frac{7}{8}$
Rouan	95 $\frac{3}{4}$
Lyons	115 $\frac{7}{8}$
Diepe	098.
Geneua	88 $\frac{1}{4}$
Toulouse	120
Rochell	122 $\frac{1}{8}$
Marcellis	121 $\frac{1}{2}$
Siuell	107 $\frac{1}{4}$
Venice suttle, &c.	164
Venice grosse, &c.	103.
Aquila	153 $\frac{3}{4}$
Vienne	87 $\frac{1}{4}$
Preslaw	131 $\frac{1}{2}$
Liebzig	94 $\frac{1}{8}$
Dantzicke	126 $\frac{1}{4}$
Lubecke	95 $\frac{1}{8}$
Barcellone	140 $\frac{5}{8}$
Lishborne	96 $\frac{3}{4}$
Geanes.	153 $\frac{3}{4}$

The agreement of the waight at Lyons, with the waights *at other places.*

Lyons.

100 li. waight at Lions doe make at	London	094 1/2
	Antwarpe	090 7/8
	Franckford, &c.	083 1/2
	Collen &c.	086 1/4.
	Nuremberge	084 1/2
	Rouan	082 1/2
	Paris	065 1/4
	Diepe	084 1/2
	Geneua	76 1/4
	Toulouse	103 1/2
	Rochell	105 1/8
	Marceiles	104 3/4
	Syuell	092 1/2
	Uenice, &c.	140 3/4
	Uenice, &c.	088 5/8
	Aquilla	132 1/2
	Uienne	75 1/4
	Preslaw	113 1/2
	Liebzig	085 1/4
	Dantzicke	109
	Lubecke	82
	Barcellone	121
	Lishborne	083 1/4
	Geanes.	132 1/2

The agreement of the VVaight at Diepe, with the waights at *other places.*

Diepe.

100 li. waight at Diep domake at	London	111 $\frac{1}{2}$
	Antwarpe	107 $\frac{1}{4}$
	Franckford	98 $\frac{3}{4}$
	Collen, &c.	102.
	Nuremberge	97 $\frac{7}{8}$
	Rouan	97 $\frac{3}{4}$
	Lyons	118 $\frac{1}{8}$
	Paris	102.
	Geneua	90 $\frac{1}{8}$
	Toulouse	122 $\frac{3}{8}$
	Rochell	124 $\frac{1}{2}$
	Marcellis	123 $\frac{7}{8}$
	Siuell	109 $\frac{3}{8}$
	Venice suttle, &c.	166 $\frac{3}{8}$
	Venice grosse, &c.	105.
	Aquila	156 $\frac{3}{4}$
	Vienne	89 $\frac{1}{8}$
	Presslaw	134 $\frac{1}{4}$
	Liebzig	101.
	Dantzicke	128 $\frac{3}{4}$
	Lubecke	97 $\frac{1}{8}$
	Barcellone	143 $\frac{1}{2}$
	Lishborne	98 $\frac{3}{4}$
	Geanes.	156 $\frac{3}{4}$

The agreement of the VVaight at Rochell, with the waights at *other places.*

Rochell.

100 li. waight at Rochell do make at

London	089 [illegible]
Antwarpe	086 1/8
Franckford	79 1/4
Collen, &c.	081 7/8
Nuremberge	80 1/8
Rouan	78 1/4
Lyons	094 7/8
Paris	081 7/8
Dieppe	080 1/4
Geneua	072 3/4
Toulouse	098 1/8
Marcellis	099 1/8
Siuell	087 7/8
Venice suttle, &c.	133 [illegible]
Venice grosse, &c.	084 [illegible]
Aquila	125 7/8
Vienna	071 [illegible]
Preslaw	107 [illegible]
Liebzig	81 [illegible]
Dantzicke	103 [illegible]
Lubecke	77 [illegible]
Barcellona	114 7/8
Lisbborne	79 [illegible]
Geanes.	125 7/8

The agreement of the Waights at Marcellis, with the waights at *other places.*

100 li. waight at Marcellis do make at

	Marcellis.
London	088 5/8
Antwarpe	086 1/2
Franckford	79 5/8
Collen & Ausberg,	082 1/4
Nuremberge	080 1/8
Rouan	078 7/8
Lions	095 1/4
Paris	082 1/4
Diepe	080 5/8
Geneua	72 1/2
Toulouse	098 3/4
Rochell	100 1/2
Siuell, &c.	088 1/4
Venice sut: wai.	134 1/4
Venice groß wa	084 3/4
Aquilla	126 1/5
Vienne	71 7/8
Preslawe	108 1/4
Liebzig	081 3/8
Dantzig	104.
Lobeck	78 1/8
Barcellone	115.
Lishburne, &c.	79 5/8
Geanes.	126 1/2

The agreement of the waight at Lishborne, with the waights *at other places.*

Lishborne.

100 li. waight at Lishborne do make at

London	113 $\frac{1}{8}$
Antwarpe	108 $\frac{3}{4}$
Franckford, &c.	100.
Collen &c.	103 $\frac{1}{4}$.
Nuremberge	102 $\frac{7}{8}$
Rouan	099.
Lions	119 $\frac{5}{8}$
Paris	103 $\frac{1}{4}$
Diepe	101 $\frac{1}{4}$
Geneua	91 $\frac{1}{4}$
Toulouse	124
Rochell	126 $\frac{1}{8}$
Marceiles	125 $\frac{1}{8}$
Syuell	118 $\frac{3}{4}$
Uenice, &c.	168 $\frac{1}{8}$
Uenice, &c.	106 $\frac{3}{8}$
Aquilla	158 $\frac{3}{4}$
Uienne	90 $\frac{1}{4}$
Preslaw	135 $\frac{7}{8}$
Liebzig	102 $\frac{1}{4}$
Dantzicke	130 $\frac{1}{8}$
Lubecke	98 $\frac{1}{4}$
Barcellons	144 $\frac{7}{8}$
Geanes.	158 $\frac{3}{4}$

The agreement of the Waights at Geanes, with the waights *at other places.*

Geanes.

100 li waight at Geanes do make at	London	071 $\frac{1}{4}$
	Antwarpe	068 [illegible].
	Frankford	62 $\frac{7}{8}$
	Collen, &c.	65
	Nuremberge	63 $\frac{1}{8}$
	Rouan	062 $\frac{1}{4}$
	Lions	075 $\frac{1}{4}$
	Paris	065.
	Dieps	063 [illegible]
	Geneua	057 [illegible]
	Toulouse	078
	Rochell	079 [illegible]
	Marseilles	079
	Siuell, &c.	069 [illegible]
	Venice sut: wai.	106
	Venice groß wa:	067
	Aquilla	100
	Vienne	56 [illegible]
	Preslaw.	085 [illegible]
	Liebzig	064 [illegible]
	Dantzig.	802 [illegible]
	Lubecke	61 [illegible]
	Barcellone	091 [illegible]
	Lishburne, &c.	062 [illegible]

Heere followveth the Table of all that is contayned *in this Booke.*

 sion

The second part of this Booke treateth of fractions or broken numbers.

The

The third part of this Booke treateth of all manner of necessary *Questions which are vsed in the trade of Marchandize.*

The

The

FINIS.